Hydrogen Ready Power Plant Project
Environmental Screening and Review Report

APPENDIX 17.2 Air Quality Impact Assessment Report

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Air Quality Impact Assessment Report

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Executive Summary

This report assesses the air quality impact of the Hydrogen Ready Power Project (HRPP). This detailed study is being conducted as part of an Environmental Review in relation to the Ontario Ministry of the Environment, Conservation and Parks (MECP) requirements for environmental assessment of electricity projects, as set out in the Ontario Regulation 116/01, under the Environmental Assessment Act. The project will be located in Courtright, St. Clair Township, Ontario, Canada. Studies, analyses and reporting with respect to the Ontario Regulation 419/05 Air Pollution - Local Air Quality the Ontario Ministry of Environment, Conservation and Parks Ambient Air Quality Criteria are contained herein.

The Hydrogen Ready Power Project will have a nominal capacity of about 600 MW and will consist of two gas turbogenerator sets (each rated nominally at 217 MVA) and one steam turbogenerator set (rated nominally at 390 MVA) configured as a combined cycle power plant to be fueled by natural gas/hydrogen gas blends as they become available. The two gas turbogenerators will be equipped with state-of-the art low NOx burner technology.

Five years of air quality data from one air monitoring station located in the vicinity of the proposed power plant were collected from the Ontario Ministry of the Environment and the Sarnia-Lambton Environmental Association (CASA) to provide baseline conditions of the existing ambient air quality. These data were used to assess the impact of emissions from the Hydrogen Ready Power Project on the local air shed. A number of air impact studies pertaining to similar combined–cycle, natural gas fueled electricity generating projects in the Sarnia Area were also reviewed so as to permit comparison of methodologies and results with this study, and to enable extension of relevant findings and conclusions from these MECP-accepted studies to the Hydrogen Ready Power Project.

For the purpose of the present analyses, the USA EPA's AERMOD modeling program was used for air dispersion modeling of the emissions from the facility. The main contaminants that will be emitted when using natural gas are oxides of nitrogen and carbon monoxide. Other contaminants that are much less prevalent include sulphur dioxide, PM10/PM2.5, trace amounts of volatile organic compounds (VOCs) and trace amounts of polycyclic aromatic hydrocarbons (PAHs). Greenhouse gas emissions include primarily carbon dioxide, with small amounts of unburned hydrocarbons (mainly methane) and nitrous oxide. All emission estimates were based on current emissions from a similar plant, guaranteed emission factors furnished by the gas turbogenerator and the duct burner manufacturers, and also on the published US EPA Emission Factors for this type of equipment. With regard to particulate emissions and owing to the lack of meaningful source reference data, it was assumed for conservative purposes, that all particulates would be emitted exclusively as PM2.5. Two gas turbine operating scenarios, full load operation and start-up followed by full load operation, were considered in the analysis to establish representative worst-case air emission conditions.

The analyses show that for all operating scenarios and environmental conditions, including conditions conducive to producing worst-case contaminant concentrations, the project's

contaminant concentrations will be below the prescribed maximum limits detailed in Ontario Regulation 419/05. The project will also not contribute to any exceedances of the Ambient Air Quality Criteria even on those occasional upset days of poor background ambient air quality. The analyses also show that the proposed power plant will meet the MECP Guideline A-5 for limits of oxides of nitrogen and carbon monoxide emissions. Emissions of greenhouse gases are reduced significantly as compared to natural gas fired power plants, depending on the hydrogen fuel mix. Studies of the current ambient air quality in the vicinity of the proposed facility, together with an analysis for the project's emissions, have indicated that the project's emissions will have only minor influence on the air shed's ambient air quality for nitrogen dioxide and even less for other contaminant emissions. On this basis, the Hydrogen Ready Power Plant facility will not contribute significantly to smog in either the local or regional air sheds.

The project will require a MECP-issued Environment Compliance Approval under Section 9 of the Environmental Protection Act, in relation to the air emissions as detailed in this report, as well as for noise emissions (reported elsewhere), prior to construction and operation of the facility. In accordance with Ontario Regulation 379/01, the Hydrogen Ready Power Plant facility will have an emissions monitoring program in place that may include continuous emissions monitoring, stack sampling and/or fuel analysis.

1.0 Introduction

This report assesses the air quality impact of the Hydrogen Ready Power Project (HRPP) in accordance with the Ministry of the Environment Conservation and Parks (MECP) requirements for environmental assessment of electricity projects as set out in the Ontario Regulation 116/01, under the Environmental Assessment Act.

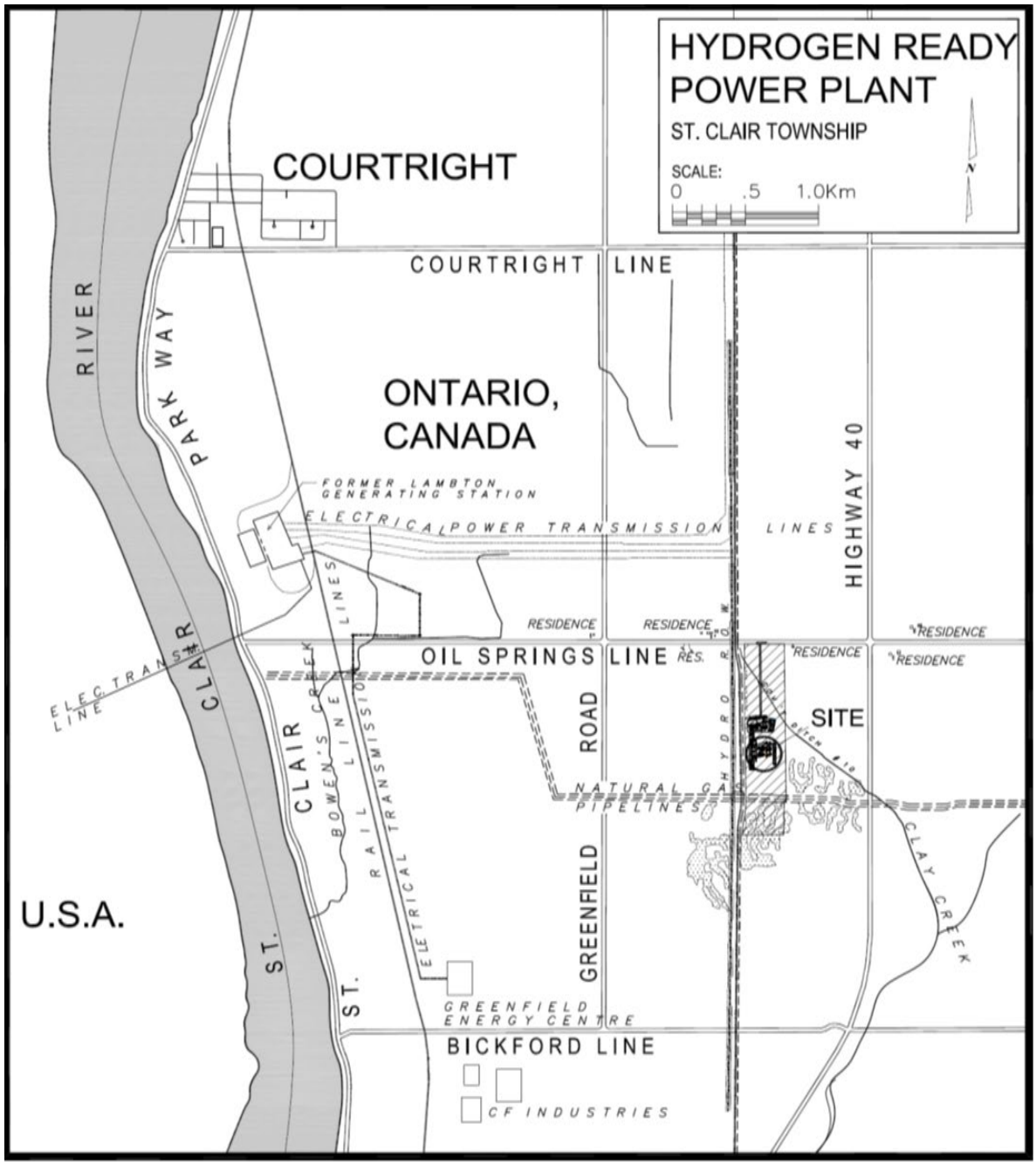
The proponent is Eastern Power Inc. (Eastern Power). Eastern Power has been involved in the design, construction and operation of electrical power generating plants in Ontario since 1988 and Eastern Power is licensed as an electricity generator by the Ontario Energy Board.

The project involves the construction and operation of a new, clean electricity, hydrogen ready generating plant. The operating pattern of the power plant is likely to be such that it will operate primarily during "shoulder" and "peak" electricity demand periods. The peak and shoulder demand periods occur typically between morning and evening on summer and winter business days. Projections suggest that the plant will likely run about 10 to 25% of the hours in a year. The plant will be able to start-up and go from no load to full load within 3 hours.

The Hydrogen Ready Power Project will have a nominal capacity of about 600 MW and consists of two gas turbo-generator set (each at 217 MVA) and one steam turbogenerator set (390 MVA), configured as a combined cycle power plant to be fueled with natural gas and supplemented with hydrogen gas.

The proposed location of the Hydrogen Ready Power Project will be in the St. Clair Township (see Figure 1 - Site Map) on industrially zoned land that is currently used for the Greenfield South Power Corporation, Green Electron Power Plant. The site is located immediately east and adjacent to Hydro One's 230 kV transmission corridor for circuit L28C. The facility is scheduled to be in-service by 2025.

Figure 1 - Site Map



1.1 Project Description

The Hydrogen Ready Power Project (HRPP) will be located in the St. Clair Township on 2 hectares of land that is zoned for heavy industrial uses, including electrical power generation under the zoning by-law of St. Clair Township. The site property currently has an existing power plant, the Green Electron Power Plant (GEPP), owned by Greenfield South Power Corporation (GSPC). The HRPP will be located about 100 meters south of the GEPP.

The site is located immediately east of Hydro One's 230 kV transmission corridor for circuit L28C. The power plant design is based on the successful technology used for natural gas combined cycle power generation throughout the world. A site plan showing the location and main elements of the facility, including the location of the emission stack is shown in Figure 2. A simplified flow diagram of the process for the power plant is attached as Figure 3. The thermal efficiency of the plant will be about 48%, based on engineering calculations using industry standard software.

Figure 2 - Site Plan

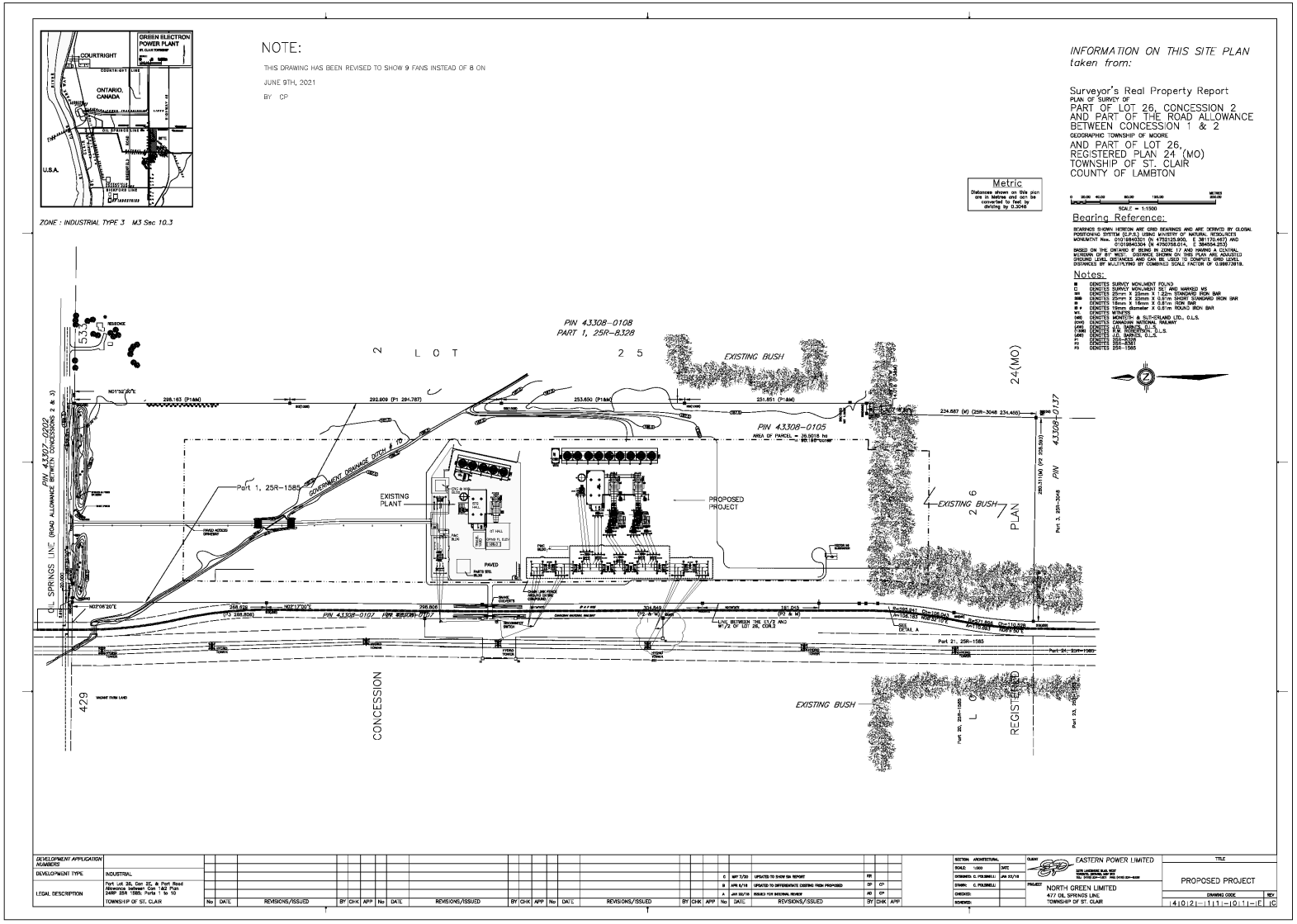
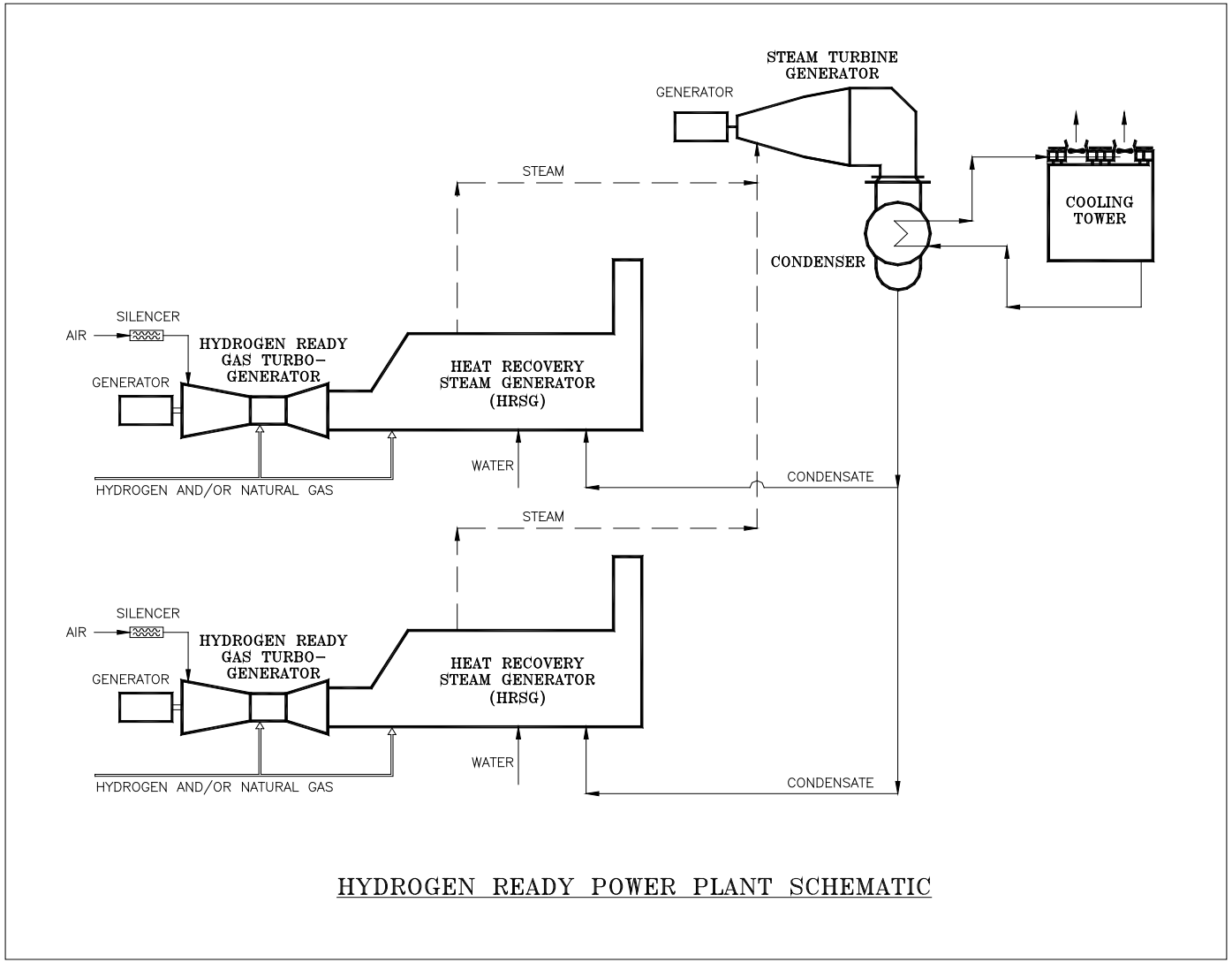


Figure 3 - Process Flow Diagram



1.1.1 Gas Turbine Generator Set

The power plant design will utilize two General Electric 7FA gas turbine generator sets or similar, fueled by natural gas with hydrogen gas as supplementary fuel. The combustion turbines will be supplied capable of utilizing up to 65% hydrogen/35% natural gas fuel mixtures. The two-gas turbine driven generator will each be rated nominally at 217 MVA.

1.1.2 Heat Recovery Steam Generator

The power plant design is based on the use of two water-tube, heat recovery steam generators (HRSG), each equipped with an auxiliary duct burner fueled by natural gas or natural gas hydrogen fuel mixture. The HRSGs will be shop constructed and site assembled. The HRSGs will be rated to deliver all of the steam required by the steam turbine generator. The steam generating system will include an economizer, multiple pressure cycles (high pressure, intermediate pressure and low-pressure steam re-heaters), pressure relief valves as well as other "trim" valves and piping.

1.1.3 Steam Turbine Generator Set

The power plant will utilize one steam turbine generator set. The unit will be purchased "packaged" with all accessories so as to reduce site installation time. The steam turbine driven generator will have a nominal rating of about 390 MVA.

1.1.4 Condenser and Boiler Feed Water Systems

The condenser will be a shell and tube heat exchanger, that will be cooled by a conventional forced draft cooling tower. The condenser will be designed to maintain the backpressure required by the full load on the steam turbine. The cooling tower is expected to evaporate and release to the air approximately 40 - 117 litres/second of water.

The boiler make-up water treatment system will use reverse osmosis, softener, and deionizer units to upgrade city water. The closed-loop condensate and boiler feedwater system will consist of a condensate receiver, a holding ejector, boiler feed pumps and condensate return pumps.

1.1.5 Electrical System

The electricity will be generated at 18 kV by the combustion turbine generators and by the steam turbine generator. This power will flow through generator step up transformers to feed the power plant’s internal loads (via the station auxiliary transformers) and then the remainder

will be exported to the Hydro One transmission system at 230 kV via the high voltage switchyard. The high voltage substation will include hot-dip galvanized steel terminal structures with circuit breakers, disconnect switches, bus, bus supports, lightning arrestors, connectors, cables, trays, etc., as well as the main output transformers. The substation will be located adjacent to the generating plant and will be enclosed by a barbed-wire fence.

The three main output transformers will be oil-filled and rated at about 150/200/250 MVA (for the two gas turbine generators) and 275/360/450 MVA (for the steam turbine generator), with two stages of fan cooling and/or forced oil cooling. The transformers will be equipped with a no-load tap changer, as well as temperature, pressure and oil level instrumentation.

Switchgear line-ups will include electrically operated generator circuit breakers and medium and low voltage circuit breakers and fused disconnects to isolate the medium voltage and low voltage switchgear and motor control centres. Current transformers and potential transformers for metering and protection will also be mounted in the switchgear. Cables or bus bars meeting the electrical safety codes will be used to connect the generators, switchgear, and transformers.

A construction phase service and back-up power source connection for the plant will be provided from the existing adjacent electricity distribution system of Hydro One Networks Inc. A relaying and metering panel will be provided to house the relaying and protection equipment, which will meet the requirements of Hydro One and the IESO. The medium voltage station service transformers will be of a dry-type and will be located indoors. Low Voltage Switchgear will be provided on the secondary side of the unit auxiliary transformers to feed power to the motor control centres.

1.1.6 Civil Works

The plant building will be a braced steel structure enclosed with pre-painted metal siding. The roof will consist of a metal roof and/or built-up membrane roofing. The operating floor and mezzanine floors will be of reinforced concrete construction, and the other platforms and walkways will be of steel grating. Windows and louvers will be provided as required for appearance and function. Acoustical and/or weather enclosures will be provided where required.

The area surrounding the plant will be graded to facilitate proper drainage of precipitation. The sanitary sewage system will be connected to the municipal sewage system. Asphalt pavement will be provided for primary walkways, driveways, and staff parking lot. Gravel paving will be used for secondary areas.

Landscaping will consist of pressure seeding of grass and planting of trees and shrubbery to meet the Township's site plan approval requirements. A chain link fence will be provided around the plant and electrical substation.

1.1.7 Instrumentation and Controls

The plant control system will be designed so that the plant can be operated from the control room, where the status of all systems can be monitored.

1.1.8 Electrical, Natural Gas and Hydrogen Gas Interconnection

The plant will be electrically interconnected with the 230 kV circuits of Hydro One, and for backup power, it will also be interconnected with the distribution circuits of Hydro One Networks Inc. The plant will receive natural gas from an existing lateral connection to a pipeline on the GSPC property and hydrogen gas as this becomes available from fuel suppliers. or from a nearby pipeline. The general location for these interconnections is shown in Figure 2 (Site Plan).

2.0 Existing Environmental Conditions

2.1 Existing Climate Conditions

The London International Airport Weather Station's historical data was used to analyze the existing climatic conditions for the Hydrogen Ready Power Project (HRPP). Although this weather station is not the closest proximity to the project location, the Ministry of Environment Conservation and Parks accepts regional meteorological data sets for screening purposes. The London International Airport Weather Station meets the World Meteorological Organization (WMO) Standards for providing climate normal data.

Southwestern Ontario has a continental climate that is moderated by the Great Lakes. Table 1 shows the monthly climate norms from 1981 to 2010. The table shows that the hottest month is July with a normal temperature of 20.8 °C and an extreme maximum of 38.2 °C in June 25, 1988. The coldest month is January with a normal temperature of -5.6 °C and an extreme minimum of -31.7 °C in January 24, 1970. The average annual temperature is about 7.9 °C. The expected total precipitation for the year is 1011.5 mm with a minimum of 65.5 mm in February and a maximum of 98.0 mm in November. Precipitation lowers the concentration of contaminants in the air. However, for the purpose of this report, the effect of precipitation was assumed to be negligible and therefore, the analyses in this report represent conservatively high estimates of the maximum ground level concentrations of contaminants that will be emitted by the Hydrogen Ready Power facility.

The average wind speed for the year is 14.1 km/h with a maximum average speed of 93 km/h in March and a minimum average speed of 56 km/h in August. The predominant wind direction ranges from the west from January to February, July, and October to December (inclusive) to

the east (March to May, inclusive and September), and with wind direction from the northwest in June and August. The yearly average wind direction is from the west. There were about 8 days of maximum wind speeds of equal to or greater than 14.4 m/s. See Figure 8 for the wind rose diagram showing the distribution of directions of wind speeds. Figure 8 was created by using the WRPLOT (Wind Rose Plot).

Table 1 London International Airport Climate Norms 1981-2010

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE													
Daily Average (°C)	-5.6	-4.5	-0.1	6.8	13.1	18.3	20.8	19.7	15.5	9.2	3.4	-2.6	7.9
Daily Maximum (°C)	-1.9	-0.5	4.4	12.1	19	24	26.4	25.3	21.1	14.2	7.2	0.9	12.7
Daily Minimum (°C)	-9.2	-8.6	-4.5	1.5	7.2	12.6	15.1	14	9.9	4.3	-0.4	-6.1	3
Extreme Maximum (°C)	16.7	17.8	24.8	29.4	32.4	38.2	36.7	37	34.4	30	24.4	18.5	
Extreme Minimum (°C)	-31.7	-29.5	-24.8	-12.2	-5	-0.6	5	1.5	-3.3	-11.1	-18.3	-26.9	
Relative Humidity (%)	75.9	71.9	65	56.9	54.8	57	57.6	59.7	59.9	63.1	72	76.9	64.2
PRECIPITATION													
Rainfall (mm)	33.4	33.6	46.3	74.7	89.4	91.7	82.7	82.9	103	78.1	83.2	46.9	845.9
Snowfall (mm)	49.3	38.4	29.4	9.4	0.4	0	0	0	0	3.2	16.6	47.6	194.3
Precipitation (mm)	74.2	65.5	71.5	83.4	89.8	91.7	82.7	82.9	103	81.3	98	87.5	1011.5
WIND													
Speed (km/h)	17.3	16.2	16.3	16.3	14	11.9	10.6	9.7	11.1	13.4	15.6	16.5	14.1
Most Frequent Direction	W	W	E	E	E	NW	W	NW	E	W	W	W	W
Maximum Hourly Speed (km/h)	87	68	93	74	89	80	63	56	58	65	72	74	93
Direction Maximum Hourly Speed	S	SW	E	SW	W	W	NW	N	SW	SW	W	E	E

2.2 Existing Air Quality and Accumulative Assessment Methodology

The existing Greater Sarnia Region's air quality is dependent on both local and long-range emission sources. To assess the effect of emissions from the project, historical air quality data (2016, 2017, 2018, 2019 and 2020) recorded at the MECP continuous air quality monitoring station in Sarnia, Station ID# 14111, at 700 Christina St. North were used in order to obtain a baseline air quality condition for the surrounding area. For carbon monoxide, historical data from 2000 and 2001 were used, since there were no data for 2016 to 2020. Since the MECP monitoring is about 20 km north of the proposed facility, air quality data were also taken from the Clean Air Sarnia and Area (CASA) Air Monitoring Network website, for the purpose of qualifying the use of the air quality data at the MECP Sarnia air monitoring station. The air quality data were taken from Aamjiwnaang, LaSalle Line, Moore Line and River Bend recording stations. The CASA website provides real-time air monitoring information to the public from nine monitoring stations that are operated by the MECP, the Aamjiwnaang First Nation and the Sarnia-Lambton Environmental Association.

Table 2a and 2b show the ambient background contaminant concentrations in the area surrounding the project as reported from these MECP and CASA sampling stations, respectively. Shown are the 90th percentiles for each contaminant species. This value represents the average of the highest concentrations for the contaminant detected in the ambient air at the 2 sampling stations over a sampling interval representing 90% of the total sampling time. Local air quality will therefore be of better quality than the 90th percentile values shown in Tables 2a and 2b, 90% of the time. Thus, excluding spurious events that may transiently cause a large increase in the ambient air quality concentration of a substance for only a very short time, the 90th percentile values can be regarded to represent the typical "poorest" air quality at these monitoring stations. These 90th percentile values were therefore used to provide a conservative assessment of the impact of the Hydrogen Ready facility on the local air quality. Thus, for the purpose for this emissions study and to provide conservative analyses, the average 1-hr 90th percentile contaminant concentrations of the five-year historical air quality data, as well as the other averaging time concentrations as listed in Table 2a, were used to represent the background concentration in the air shed of the proposed power plant. Tables 2a and 2b also show maximum values and these represent the maximum value occurrence of a particular year.

Table 2a Summary of MECP Ambient Air Quality in Sarnia

Species	Parameter	2000	2001	2016	2017	2018	2019	2020	5 year average	5 year Annual Max	5 year average (ug/m^3)	5 year Annual Max (ug/m^3)
Carbon Monoxide (CO) ppm	1 h 90th Percentile	0.64	0.51						0.58	0.64	692.96	771.29
	8 h 90th Percentile	0.73	0.63						0.68	0.73	818.82	882.01
Nitrogen Dioxide (NO_2) ppb	1 h 90th Percentile			16	16	17.1	15.4	13.9	15.7	17.1	31.0	33.9
	24 h 90th Percentile			12	12	14	13.0	11.2	12.7	14.5	25.2	28.7
	Annual			7	7	7.6	6.8	5.9	7.0	7.6	13.9	15.0
Nitrogen Oxide (NO) ppb	1 h 90th Percentile			3	3	3.5	3.16	3.1	3.2	3.5	4.1	4.5
PM10 (ug/m^3)	24 h Maximum			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PM2.5 (ug/m3)	24 h 90th Percentile			12	12	14	13	13	13	14	13	14
	Annual			7	7	7	7	7	7	7	7	7
Sulphur Dioxide (SO_2) ppb	10 min											
	1 h 90th Percentile			4	4	4.3	3.7	3.5	3.9	4.3	10.7	11.7
	Annual			1.7	1.7	1.9	1.9	2.0	1.8	2.0	5.0	5.4
VOC 1,3 Butadiene (ug/m^3)	24 h 90th Percentile			0.337	0.172	0.273	0.084	0.191	0.211	0.337	0.211	0.337
	Annual			0.089	0.071	0.083	0.050	0.074	0.073	0.089	0.073	0.089
VOC Benzene (ug/m^3)	24 h 90th Percentile			1.711	1.095	1.299	0.739	0.943	1.157	1.711	1.157	1.711
	Annual			0.696	0.604	0.578	0.428	0.543	0.570	0.696	0.570	0.696
VOC Toluene (ug/m^3)	24 h 90th Percentile			3.401	3.693	2.171	1.638	1.116	2.404	3.693	2.404	3.693
VOC Ethylbenzene (ug/m3)	24 h 90th Percentile			0.764	0.399	0.534	0.259	0.215	0.434	0.764	0.434	0.764
	Annual			0.283	0.211	0.237	0.119	0.094	0.189	0.283	0.189	0.283
VOC m-, p-Xylene (ug/m^3)	24 h 90th Percentile			0.905	0.809	0.893	0.533	0.412	0.710	0.905	0.710	0.905
VOC o-Xylene (ug/m^3)	24 h 90th Percentile			0.326	0.311	0.344	0.200	0.152	0.267	0.344	0.267	0.344

Notes:

1. ppm and ppb converted to $\mu g/m^3$ using the following formulae: (ppm)(12.187)(MW)(1000) / (273.15 + °C) and (ppb)(12.187)(MW) / (273.15 + °C) at 10 °C, where MW is the molecular weight of the species or contaminant.
2. The MECP air quality data for 2016 through 2020 do not include PM10 data.
3. The MECP air quality data for the Sarnia Monitoring Station only includes CO data for 2000 and 2001

Table 2b Summary of CASA Ambient Air Quality

Species	Parameter	2016	2017	2018	2019	2020	4 year average	4 year Annual Max	4 year average (ug/m_3)	4 year Annual Max (ug/m_3)
Carbon Monoxide (CO) ppm	1 h 90th Percentile	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	8 h 90th Maximum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nitrogen Dioxide (NO_2) ppb	1 h 90th Percentile	N/A	10	11	11	9	10	11	20	22
	24 h 90th Percentile	N/A	9	10	9	7	9	10	17	20
Nitrogen Oxide (NO) ppb	1 h 90th Percentile	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PM10 (ug/m^3)	24 h 90th Percentile	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PM2.5 (ug/m3)	24 h 90th Percentile	N/A	13	14	13	12	13	14	13	14
	Annual	N/A	8	7	7	7	7.4	8	7	8
Sulphur Dioxide (SO_2) ppb	Annual	N/A	1.2	1.5	1.7	1.2	1.4	1.7	1.7	2.0

Notes:

1. ppm and ppb converted to $\mu g/m^3$ using the following formulae: (ppm)(12.187)(MW)(1000) / (273.15 + °C) and (ppb)(12.187)(MW) / (273.15 + °C) at 10 °C, where MW is the molecular weight of the species or contaminant.
2. N/A denotes no available data.
3. From CASA website: “Air quality data on this website are automatically polled from the Clean Air Sarnia and Area monitoring network and are intended for public awareness. Because the data is real time, they have not undergone complete quality control and quality assurance procedures, and so they may contain errors and are subject to change. The real-time air quality data on this web page are considered “unverified data” and should not be used in published documents.”

3.0 Facility Atmospheric Emissions

Atmospheric emissions from the Hydrogen Ready facility will result from two natural gas fired (with hydrogen gas as supplementary fuel) gas turbine generators with all of its flue gas exhausting through its respective heat recovery steam generator (HRSG), equipped with a natural gas/natural gas and hydrogen gas fuel mixture duct burner. The emissions from this system will be exhausted through its respective single 43 m high stack.

The total heat input of the space heaters is approximately only 0.05% of the total heat input to the gas turbine generator and HRSG. Therefore, space heater emissions to the atmosphere can be assumed to be negligible and were not included in the present analyses. Similarly, other very minor sources of potential fugitive emissions arising from the use of transformer cooling oils, machinery lubricants, water treatment chemicals and general cleaning materials were considered to be insignificant for the purposes of the present analyses and were not further assessed.

3.1 Power Plant Stack Emissions

The combustion of natural gas produces primarily the following direct emission products:

- NOx – consists of primarily NO and trace amounts of NO_2
- CO – resulting from incomplete combustion
- SO_2 – resulting from mercaptan odorant additive
- PM10 – particulate matter below 10 microns in size
- PM2.5 – particulate matter below 2.5 micron in size

The combustion of hydrogen gas produces primarily the following direct emission products:

- NOx - consists of primarily NO and trace amounts of NO_2

Based on the LEDHER/Montrose stack testing reports (2018, 2019, 2021) for the Green Electron Power Plant, SO_2 emissions are negligible since mercaptan odorant additives are not used in the natural gas. This additive will also not be used for the proposed Hydrogen Ready facility and therefore, SO_2 is considered to be zero in this analysis.

For the purpose of these analyses, all particulate matter emissions are assumed to be PM2.5. The emission rates for the above products were obtained from the gas turbine and low NOx duct burner manufacturers. The gas turbine generator will be equipped with low NOx burner technology.

The project will result in the indirect emissions of ground-level ozone (O_3), which results from the chemical reaction of NOx, oxygen and sunlight. Some NO_2 reacts with sunlight to produce ozone and NO. Some NO reacts with the ozone in the atmosphere to produce NO_2. The combustion of natural gas also produces trace quantities of various volatile organic compounds

(VOC), as non-combusted fuel and trace quantities of polycyclic aromatic hydrocarbons (PAH). For the purpose of this emission study, emission factors for the combustion of natural gas were taken from the US EPA AP-42 for VOCs and PAHs. Tables 6 through 9 in Section 9.1, summarize all the potential atmospheric emissions and their rates of emission from the power plant when utilizing various natural gas and hydrogen fuel blends.

4.0 Operating Scenarios

The power plant is expected to operate only during periods of high and intermediate demand for electricity, typically on non-holiday weekdays. During this period, the power plant is projected to operate at or near 100% capacity, up to 10.9 h per non-holiday weekday. The duct burners will operate to provide additional heat input for the steam turbine driven generator to achieve a nominal net electrical output of up to 660 MW in some situations. The following operating scenarios and their associated emission rates were considered in this study:

Maximum Emission Scenario (start-up conditions, followed by Full Load Operations)

Start-Up Conditions
Given the expected peak and shoulder operating pattern, the Facility is expected to undergo approximately 173 start-ups per year, representing about 9% of the total operating hours. The length of time since the unit was last shut down determines the type of start-up procedure to be followed: hot, warm or cold. The three types of start-ups vary in the time that the steam turbine and steam pipelines will be warmed up by operation at 10% gas turbine load and then ramped more or less evenly back to full load. Approximately 83 start-ups are expected to be hot starts, 65 are expected to be warm starts and 27 are expected to be cold starts. Note that the HRSG auxiliary duct burner will not be in operation and no hydrogen gas is used during any of the startup conditions as discussed below.

Warm Start
A warm start procedure will be used whenever the gas turbine is started within 48 hours of its previous shutdown. Given the expected peak and shoulder operating pattern of the project, approximately 37.5% of all start-ups will be warm starts. During a warm start the gas turbine will operate at 0% load for 30 minutes, then at 10% load for about 50 minutes and then ramp more or less evenly up to 100% load over 40 minutes. There are no significant emissions during the 30 minutes at 0% load.

Hot Start
The hot start procedure will be used whenever the gas turbine is started within 8 hours of its previous shutdown. Given the expected peak and shoulder operating pattern of the project, hot starts will be used primarily for meeting flexibility needs of the IESO and also following electrical trips due to quick clearing faults. During a hot start the gas turbine will operate at 0%

load for 30 minutes, then at 20% load for about 30 min and ramp up more or less evenly to 100% load over 10 minutes. There are no significant emissions during the 30 minutes at 0% load.

Cold Start

The cold start procedure will be used whenever the gas turbine is started after being shut down for at least 72 hours. Given the expected peak and shoulder operating pattern of the project, 27 cold starts will be used very infrequently. During a cold start the gas turbine will operate at 0% load for 30 minutes, then at 8% load for about 120 minutes and ramp up more or less evenly to 100% load over 30 minutes. There are no significant emissions during the 30 minutes at 0% load.

Assessment of Start-up Impact

Start-up conditions have been analyzed in detail in terms of their capacity for brief intervals with higher rates of emissions. Table 9 summarizes the emission rates during the entire start-up period (light-off to full load). For 100% natural gas and 80%/20% natural gas-hydrogen gas mixture, the cold start scenario was used for NOx and PM, since this start-up yields the highest emission, according to the averaging period for the relevant MECP POI Limit corresponding to the respective contaminant. Similarly, the warm start scenario was used for CO. For 35%/65% natural gas-hydrogen gas mixture, the hot start scenario was used for NOx and PM, while the warm start was used for CO. Although the gas turbine manufacturer has indicated that the emission rate for PM10 can be taken as 100% PM2.5, they only provided PM10 emission rates for full load conditions. Section 3.1 of the US EPA AP-42 shows that total particulate matter emissions from natural gas fired are the same at different loads, since particulate matter results from carryover of noncombustible constituents in the fuel. Therefore, particulate matter emission rates for all start up scenarios were assumed to be equal to particulate matter emission rates at full load. For all start up conditions, only natural gas was used for the fuel.

Full Load Operation

Gas Turbine operating at 100% capacity, supplementary HRSG duct firing at 100% capacity and 10.9 hours per week day, with the following fuel usage configurations:

- Natural gas 100%
- Natural gas 80%, hydrogen gas 20%
- Natural gas 35%, hydrogen gas 65%

5.0 Greenhouse Gases

Greenhouse gases (GHG) are also products of the combustion of fossil fuels but not for hydrogen gas. The main GHGs are carbon dioxide (CO_2) from combustion, methane (CH_4) released as non-combusted fuel, and nitrous oxide (N_2O) as potentially produced during combustion. For the Hydrogen Ready Power Project, the main greenhouse gas is carbon dioxide, with trace amounts of nitrous oxide and unburned hydrocarbon (UHC) or methane. The use of hydrogen gas as supplementary fuel will significantly reduce the GHG emissions of the facility. Table 3 shows the expected total annual greenhouse gas emissions of the proposed Hydrogen Ready Power Plant with supplementary duct firing and hydrogen gas, operating 25% of the yearly hours.

Carbon dioxide, methane and nitrous oxide emissions were calculated using the Ontario's Guideline for Quantification, Reporting and Verification of Greenhouse Gas Emissions (February 2020) and Canada's Greenhouse Gas Quantification Requirements Version 4.0 (CGGQR), published by Environment and Climate Change Canada. Equation 2-8 from CGGQR was used to calculate the annual mass of carbon dioxide and equation 2-13 from CGGQR was used to calculate the annual mass of methane (13 g/GJ methane emission factor) and nitrous oxide (1.3 g/GJ nitrous oxide emission factor). The global warming potentials of 25 and 298 were used for methane and nitrous oxide, respectively.

Table 3: Projected Annual Greenhouse Gas Emissions

Greenhouse Gas	100% Natural Gas Emissions (tonne)	35% Natural Gas - 65% Hydrogen Emissions (tonne)	80% Natural Gas - 20% Hydrogen Emissions (tonne)	Global Warming Potential	100% Natural Gas Emissions CO_2e (tonne)	35% Natural Gas - 65% Hydrogen Emissions CO_2e (tonne)	% Reduction Using 35:65 NG to H_2	80% Natural Gas - 20% Hydrogen Emissions CO_2e (tonne)	% Reduction Using 80:20 NG to H_2
Carbon Dioxide (CO_2)	262122	115229	216955	1	262122	115229		216955	
Methane (CH_4)	132	58	109	25	3296	1449		2728	
Nitrous Oxide (N_2O)	13	6	11	298	3929	1727		3251	
Total GHG					269347	118405	56.0	222934	17.2

The impact of GHG emissions is best appreciated in comparison to a baseline for emissions. For the Hydrogen Ready Power Project which replaces natural gas fired generation, the baseline can be described as GHG emissions from natural gas fired electrical power facilities. The use of hydrogen fuel will substantially lower GHG emissions for electrical power generation in direct relation to the hydrogen content utilized. The Hydrogen Energy Platform is being developed

through support of the Ontario and Federal Governments as an important strategy for lowering Greenhouse Gas (GHG) carbon emissions and to help meet future GHG reduction targets. Hydrogen energy development strategies have now been initiated in Ontario (Ontario Hydrogen Strategy) and this includes using hydrogen for electrical power generation.

6.0 Emission Limits for Gas Turbines

The Ministry of the Environment, Conservation and Parks (MECP) has revised the original version of Guideline A-5, which was published in 1994, from the national guideline developed by the Canadian Council of Ministers of the Environment (CCME) which stipulates maximum emission rates for oxides of nitrogen (NOx), carbon monoxide and oxides of sulphur (expressed as SO_2) for any new or modified stationary gas turbine using gaseous, liquid or solid derived fuels. The emission limits are determined by the plant's useful output power at 100% load, its fuel type and whether the unit is run for peaking or not. The guideline defines a peaking combustion turbine as "a stationary combustion turbine that is operated for 1500 hours or less within a calendar year." Since the Hydrogen Ready Power Project will not be a base load plant, it is expected to operate less than 1500 hours per year. Therefore, the project is defined as a peaking plant for the purposes of the MECP Guideline A-5.

The maximum allowable NOx emission rate is therefore determined as follows for 100% NG, 80%/20% Natural Gas to Hydrogen gas fuel mixture and 35%/65% Natural to Hydrogen gas fuel mixture:

100% Natural Gas

Parameter	Units	CTG-2002	CTG-2003
Cycle configuration	-	combined	combined
Heat input to combustion turbine	GJ/hr	1814.70	1814.70
Heat input to combustion turbine	MW	504.08	504.08
Power output, combustion turbine	MW	195.30	195.30
		HRSG-2002	**HRSG-2003**
Heat input to auxiliary burner(s)	GJ/hr	290.14	290.14
Heat input to auxiliary burner(s)	MW	80.59	80.59
STG-2002 output divided evenly to CTG-2002/2003		**STG-2002**	
Power output, Rankine cycle turbine	MW	175.50	175.50
Power generation/output	**MW**	**370.8**	**370.8**
Total Power generation/output	**MW**	**741.6**	
Thermal efficiency (Equation 10)	**%**	**63.4%**	**63.4%**
F-factor for NG on a dry basis	DSm^3/GJ	240	240
Output-based NOx emission limit (Table 1) Peaking	g/GJ	140	140
Calculated maximum NOx emission rate (Equation 5)	g/hr	186,883	186,883
Calculated maximum NOx emission concentration (Equation 2)	ppmv	55.6	55.6
Applicable NOx emission limit (Equation 8, but not Table 2)	**ppmv**	**55.6**	**55.6**

80% Natural Gas/20% Hydrogen Gas

Parameter	Units	CTG-2002	CTG-2003
Cycle configuration	-	combined	combined
Heat input to combustion turbine	GJ/hr	1814.70	1814.70
Heat input to combustion turbine	MW	504.08	504.08
Power output, combustion turbine	MW	195.30	195.30
		HRSG-2002	**HRSG-2003**
Heat input to auxiliary burner(s)	GJ/hr	290.14	290.14
Heat input to auxiliary burner(s)	MW	80.59	80.59
STG-2002 output divided evenly to CTG-2002/2003		**STG-2002**	
Power output, Rankine cycle turbine	MW	175.50	175.50
Power generation/output	**MW**	**370.8**	**370.8**
Total Power generation/output	**MW**	**741.6**	
Thermal efficiency (Equation 10)	**%**	**63.4%**	**63.4%**
F-factor for NG+ H2 on a dry basis	DSm^3/GJ	237	237

Parameter	Units	CTG-2002	CTG-2003
Output-based NOx emission limit (Table 1) Peaking	g/GJ	140	140
Calculated maximum NOx emission rate (Equation 5)	g/hr	186,883	186,883
Calculated maximum NOx emission concentration (Equation 2)	ppmv	56.2	56.2
Applicable NOx emission limit (Equation 8, but not Table 2)	**ppmv**	**56.2**	**56.2**

35% Natural Gas/65% Hydrogen Gas

Parameter	Units	CTG-2002	CTG-2003
Cycle configuration	-	combined	combined
Heat input to combustion turbine	GJ/hr	1814.70	1814.70
Heat input to combustion turbine	MW	504.08	504.08
Power output, combustion turbine	MW	195.30	195.30
		HRSG-2002	**HRSG-2003**
Heat input to auxiliary burner(s)	GJ/hr	290.14	290.14
Heat input to auxiliary burner(s)	MW	80.59	80.59
STG-2002 output divided evenly to CTG-2002/2003		**STG-2002**	
Power output, Rankine cycle turbine	MW	175.50	175.50
Power generation/output	**MW**	**370.8**	**370.8**
Total Power generation/output	**MW**	**741.6**	
Thermal efficiency (Equation 10)	**%**	**63.4%**	**63.4%**
F-factor for NG+H2 on a dry basis	DSm^3/GJ	226	226
Output-based NOx emission limit (Table 1) Peaking	g/GJ	140	140
Calculated maximum NOx emission rate (Equation 5)	g/hr	186,883	186,883
Calculated maximum NOx emission concentration (Equation 2)	ppmv	59.0	59.0
Applicable NOx emission limit (Equation 8, but not Table 2)	**ppmv**	**59.0**	**59.0**

The above formulae yield the NOx emission limits of NOx of 55.6 ppmv for 100% natural gas, 56.2 ppmv for 80% Natural Gas and 20% Hydrogen gas fuel mixture and 59.0 ppmv for 35% Natural Gas and 65% Hydrogen gas fuel mixture. Based on the gas turbine manufacturer, the expected NOx emissions are 9 ppmv with 100% natural gas and 25 ppmv with 35% natural gas and 65% hydrogen gas fuel mixture. Therefore, the Hydrogen Ready Project's emissions will meet the MECP A-5 allowable limit for NOx.

The emission limit for carbon monoxide emission is specified in Section 5.3 of MECP Guideline A-5 as 50 ppmv corrected to 15% O_2 at reference conditions (15 ^oC, 101.325 kPa). With the gas turbine operating at the maximum output and supplementary duct firing, the carbon monoxide emission will be 2 ppmv for 100% natural gas and 27 ppmv for 35% natural gas and 65% hydrogen gas fuel gas mixture. Therefore, the Hydrogen Ready emissions of carbon monoxide emissions will meet the MECP A-5 allowable limit for CO.

The MECP A-5 Guideline specified that if the total sulphur in the gaseous fuel does not meet the expectations for natural gas and hydrogen gas (> 120 mg/m^3 SO_2) then source testing will be expected for SO_2. Based on the LEHDER/Montrose reports of 2017, 2019 and 2021, SO_2 emissions are considered to be zero for natural gas and hydrogen would not be expected to contribute to sulphur emissions.

7.0 Proposed Emissions Monitoring Program

The proposed power plant will require an emissions monitoring program that may include continuous emissions monitoring, stack sampling, and/or fuel analysis. The selection of one of these monitoring programs will depend on the specific approach of compliance with Guideline A-5 and O.Reg. 397/01. The emission data and plant information will be submitted to the MECP as per the regulation and published guidelines.

8.0 Air Dispersion Modeling

8.1 Assessment Criteria

Ontario Regulation 419/05 establishes limits for half-hour, one hour and 24-hour contaminant concentration at certain critical points of impingement (POI), which all facilities must meet. These point of impingement criteria addresses the facility's emission impacts on its surroundings.

The MECP has also established air quality targets for contaminant concentrations called Ambient Air Quality Criteria (AAQC), which are considered an acceptable concentration of an air contaminant to protect human health or the environment. The AAQCs are assigned different averaging times (e.g., 24-hour, 8 hour and 1 hour) appropriate for the adverse effect that they are intended to protect against. The effects that are considered are health, odour, vegetation, soiling, visibility, corrosion or other effects. The Canadian Council of Ministers of the Environment (CCME) also developed the Canadian Ambient Air Quality Standards (CAAQS). The 2025 1-hour and annual CAAQS for nitrogen dioxide (NO_2) were also used in this study. The CAAQS 1-hour NO_2 concentration uses a statistical form of a 3-year average of the 98^{th} percentile of the daily maximum 1-hour average concentration. However, this statistical form is

not required for the purpose of this study and the 90th percentile of the background was used for NO_2 as a comparison to the 2025 CAAQS 1-hour NO_2.

For the purpose of this assessment, only nitrogen oxides (NO_2), carbon monoxide (CO), sulphur dioxide (SO_2), and particulate matter (PM assumed to be 100% PM2.5) were evaluated because these have the greatest impact on air quality surrounding the power plant. Volatile Organic Compounds (VOCs) emissions will be very small but they were also modelled.

Table 4 shows the MECP POI Criteria, AAQC and CAAQS for each of the species and sub species of interest in this assessment.

Table 4 - MECP POI Criteria Limits, Ambient Air Quality Criteria and Canadian Ambient Air Quality Standards

Species	Averaging Period	MECP POI Criteria (ug/m^3)	MECP AAQC (ug/m^3)	CCME CAAQS (ppb)
NO_2	1 h	400	400	42
	24 h	200	200	N/A
	Annual	N/A	N/A	12
CO	0.5 h	6000	N/A	N/A
	1 h	N/A	36200	N/A
	8 h	N/A	15700	N/A
PM10	24 h	120	50	N/A
PM2.5	24 h	120	27	N/A
	Annual	N/A	8.8	N/A
Benzene	Annual	0.45	0.45	N/A
	24 h	N/A	2.3	N/A
Butadiene, 1,3-	Annual	2	2	N/A
	24 h	N/A	10	N/A
Ethyl Benzene	24 h	1000	1000	N/A
	10 min	N/A	1900	N/A
Toluene	24 h	N/A	2000	N/A
Xylenes	24 h	730	730	N/A
	10 min	N/A	3000	N/A

8.2 Methodology

The Facility is subject to s.20 of O. Reg. 419/05 and as such, the assessment of compliance with Schedule 3 standards, with the additional assessment of AAQCs compliance, was carried out with the aid of the U.S. EPA AERMOD atmospheric dispersion model. Dispersion modeling was completed in accordance with the MECP Guideline A-11 "Air Dispersion Modeling Guideline for Ontario, Version 3.0". A general description of the input data used in the dispersion model is provided below.

The AERMOD modeling system has been identified by the MECP as one of the approved dispersion models under O. Reg. 419/05, and currently includes the Plume Rise Model Enhancements (PRIME) algorithms for assessing the effects of buildings on air dispersion. It is applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources such as point, area, and volume sources. The AERMOD modeling system is made up of the AERMOD dispersion model, the AERMET meteorological pre-processor and the AERMAP terrain pre-processor.

The following approved dispersion model and pre-processors were used in the assessment:

- AERMOD dispersion model (v. 19191)
- AERMAP surface pre-processor (v. 18081)
- BPIP building downwash pre-processor (v. 04274)

AERMET was not used in this assessment, as a pre-processed MECP meteorological dataset was used.

A description of the way in which the AERMOD input parameter were derived is shown in the table below, Dispersion Modeling Input Summary Table.

Dispersion Modeling Input Summary Table

Relevant Section of Regulation 419	Section Title	Description of How the Approved Dispersion Model was used
Section 6	Approved Air Dispersion	AERMOD dispersion model (v.19191) AERMAP surface pre-processor (v.18081) BPIP building downwash pre-processor (v..04274)
Section 8	Negligible Sources	As seen in the tables 6a to 6d, inclusive, Source ID STK 2002 and ID STK 2003 emit the largest amounts of emissions with oxides of nitrogen, carbon monoxide, particulate matter (assumed to be 100% PM2.5) being the most significant emissions
Section 9	Same Structure Contamination	Not applicable as the HRPP is the only owner/tenant occupying the building, and does not have a child care facility, health care facility, senior's residence, long-term care facility or an educational facility located at the Facility.
Section 10	Operating Conditions	The two gas turbines, two HRSGs and its respective duct burners were assumed to be operating at the maximum production rates at the same time, 10.9 hr per week day. See section 4.0 for more details

Relevant Section of Regulation 419	Section Title	Description of How the Approved Dispersion Model was used
Section 11	Source of Contaminant Emission rates	The emission rate for each significant contaminant emitted from a significant source was estimated, the methodology for the calculation is documented in Tables 6 to 8, inclusive. Gas turbine emission rates for NO_2, CO and PM were taken from the manufacturer. USA EPA emission rates were used for the HRSG duct burner emission rates for NO_2, CO, and PM and for all other contaminants listed in tables 6a to 6d, inclusive. See section 4.0 and section 9.1 and Appendix B – Air Quality Impact Study Supporting Calculations for more information.
Section 12	Combined Effect of Assumptions for Operating Conditions and Emission rates	The Operating Conditions were estimated in accordance with s.10(1) 1 and s.11(1) 1 of O. Reg. 419 and are therefore considered to result in the highest concentration at POI that the Facility is capable of for the contaminants emitted. See section 4.0 and Section 9.1
Section 13	Meteorological Conditions	MECP's Regional Dataset for Southwestern Ontario (London), Crop was used.
Section14	Area of Modeling Coverage	Model coverage set to match MECP guidelines
Section 15	Stack Height for Certain New Sources of Contaminant	All stacks meet the requirements of s.15 and GEP.
Section 16	Terrain Data	MECP DEM file (GeoTIFF format) used: cdem_dem_040j.tif
Section 17	Averaging Periods	The appropriate averaging periods (as defined by the regulatory limits outlined in 3, and in the listing of the MECP Guidelines) were modeled for each contaminant.

The following meteorological elements were used for the 5-year period from 1996 to 2000: ceiling height, wind speed, wind direction, air temperature, total cloud opacity and total cloud amount. Anemometer height of 10 meters was used. For the purpose of this analysis, the surface meteorological data sets were gathered from the London International Airport and the upper air meteorological data were gathered from the White Lake Upper Air Station (closest upper air station to the site), using the "crop" data set.

The following 3250 m x 3500 m nested receptor grid of 1801 receptor points was used to predict on-site and off-site contaminant concentration profiles, centered around the two HRSG stacks:

a) 20 m spacing, within an area of 200 m by 200 m
b) 50 m spacing, within an area surrounding the area described in (a) with a boundary at 300 m by 300 m outside the boundary of the area described in (a)
c) 100 m spacing, within an area surrounding the area described in (b) with a boundary at 800 m by 800 m outside the boundary of the area described in (a)
d) 200 m spacing, within an area surrounding the area described in (c) with a boundary at 1,800 m by 1,800 m outside the boundary of the area described in (a)
e) 500 m spacing, within an area surrounding the area described in (d) with a boundary at 3250 m by 3250 m outside the boundary of the area described in (a)

For the 500 m spacing, a 3250 m by 3250 m boundary was used since the GeoTIFF terrain data file does not go beyond the 3250 m at the west side, beyond the St. Clair River that

borders Canada and Michigan State, USA. In addition to using the nested receptor grid, receptors were also placed every 10 metres along the property line.

Terrain data used in this assessment was obtained from the MECP (GeoTIFF format). The GeoTIFF file used in this assessment is:

- cdem_dem_040J.tif

8.3 Receptors of Interest

The receptors of interests are the nearest residential dwellings. The nearest residential dwellings of 1 and 2 storey buildings are located along Oil Springs Line as listed in Table 5 and located as shown in Figure 4. Although there are additional residences in the surrounding area, these receptors of interests were specifically chosen because they are the closest to the proposed power plant.

Table 5 - Receptors of Interest

Receptor ID	Description
R1	Residential – 2 Storey
R2	Residential – 2 Storey
R3	Residential – 2 Storey
R4	Residential – 2 Storey
R5	Residential – 2 Storey
R6	Residential – 2 Storey

Figure 4 - Receptors of Interest

8.4 Stack Plume and Cooling Tower Plume Visibility and Icing Analysis

Water vapour will be released from the proposed facility both as a combustion product from the stack and more so from the cooling tower. Under certain atmospheric conditions this water release to the air can be visible as a plume. Ambient air can only hold a certain amount of water vapour (the moisture ratio = mass of water to mass of air) that depends on the ambient dry bulb temperature. The lower the ambient temperature, the lower the moisture carrying capacity of the air. Relative humidity indicates the amount of water vapour in ambient air relative to the amount of water vapour that air would be able to hold if it were saturated with water vapour. Moisture plume visibility depends on the ability of the ambient air to absorb the plume water vapour. If the ambient air is saturated, it cannot absorb additional water vapour and a water vapour plume will be visible. The length of the visible plume depends on the required dispersion or dilution of the moisture plume within the ambient air that is needed in order to reduce the moisture concentration in the plume below the saturation level of the ambient air. Appendix A details the cooling tower plume and icing analysis, prepared by ORTECH Consulting Inc. ORTECH's analysis shows that the potential icing events on Highway 40 and Oil Springs Line are expected to be 1% of the time in a year and therefore can be considered insignificant in terms of adverse impacts on Highway 40 and Oil Springs Line.

It has been reported, from similar facilities that a yellow-brownish plume discharge from the HRSG stack. This visible plume is the result of elevated nitrogen oxides in the flue gas. This normally occurs only for a short period during the start-up of the facility. As noted in Section 4, the emission rate of nitrogen oxides is at its maximum during the start-up phase of the gas turbine where fuel combustion is at its lowest efficiency (see Table 7). Once the gas turbine reaches peak efficiency, the nitrogen oxide emission rate drops to approximately half that during start up. As discussed in Section 9.3, the dispersion modelling results show that the nitrogen oxide concentration is well below the MECP Point of Impingement Criteria and as well as the MECP Ambient Air Quality Criteria, using the worst-case emission flow rate scenario.

9.0 Dispersion Modeling Results

9.1 Summary of Emissions

Table 6 shows a summary of expected emissions and their rates of emission from all sources from the HRPP facility. Tables 7 shows the expected start-up emission rates and Table 8 shows the expected emission rates on the individual start-up conditions, followed by full load operation. Table 9 shows the expected maximum emission rates on start-up, followed by full load operation. Table 9 was derived from Table 8, by choosing the start-up condition that yields the maximum emission rate. All tables for Source ID STK 2002 and Source ID STK 2003, HRSG Stacks are for full load operation, which includes supplementary hydrogen gas and natural gas duct firing. As seen in the tables below, Source ID STK 2002 and ID STK 2003 emit the largest amounts of emissions with oxides of nitrogen, carbon monoxide, particulate matter

(assumed to be 100% PM2.5) being the most significant emissions. Therefore, only these significant contaminants were analyzed further and are discussed with respect to cumulative ambient air and point of impingement impacts, using the expected maximum emission rates from Table 9. All emission rates in the Tables below are based on design operating conditions of 7°C ambient temperature (i.e., near the average annual temperature, see Table 1) and 10.9 hours of weekday operation.

Table 6a - Expected Emissions from all Facility Sources – 100% Natural Gas

Fuel Mixture: 100% Natural Gas										
Source Data						Emission Data				
Source ID	Description	Exhaust Flow (kg/s)	Flow Temp. (°C)	Stack Dia. (m)	Height Above Grade (m)	Contaminant	Emission Rate (g/s)	Data Quality	Estimation Type	Percentage of Overall Emission
STCK 2002	HRSG 2002 Stack	462.2	82.2	6.01	43	NO_2	10.51	Above Average	EC	49.6%
						CO	10.17	Above Average	EC	49.8%
						PM	2.39	Above Average	EC	48.9%
						SO_2	0.00	Above Average	EC/EF	N/A
						Acetaldehyde	0.0079	Above Average	EF	50.0%
						Acrolein	0.0013	Above Average	EF	50.0%
						Benzene	0.0024	Above Average	EF	50.0%
						1,3-Butadiene	0.000085	Marginal	EF	50.0%
						Ethylbenzene	0.0063	Above Average	EF	50.0%
						Formaldehyde	0.14	Above Average	EF	50.0%
						Isomers of xylene	0.013	Above Average	EF	50.0%
						Naphthalene	0.00026	Above Average	EF	50.0%
						PAH	0.00043	Above Average	EF	50.0%
						Propylene oxide	0.0057	Marginal	EF	50.0%
						Toluene	0.026	Above Average	EF	50.0%
						TOC	2.17	Above Average	EF	50.0%
						VOC	1.94	Marginal	EC/EF	50.0%
STCK 2003	HRSG 2003 Stack	462.2	82.2	6.01	43	NO_2	10.51	Above Average	EC	49.6%
						CO	10.17	Above Average	EC	49.8%
						PM	2.39	Above Average	EC	48.9%
						SO_2	0.00	Above Average	EC/EF	N/A

Fuel Mixture: 100% Natural Gas										
Source Data						Emission Data				
Source ID	Description	Exhaust Flow (kg/s)	Flow Temp. (°C)	Stack Dia. (m)	Height Above Grade (m)	Contaminant	Emission Rate (g/s)	Data Quality	Estimation Type	Percentage of Overall Emission
						Acetaldehyde	0.0079	Above Average	EF	50.0%
						Acrolein	0.0013	Above Average	EF	50.0%
						Benzene	0.0024	Above Average	EF	50.0%
						1,3-Butadiene	0.000085	Marginal	EF	50.0%
						Ethylbenzene	0.0063	Above Average	EF	50.0%
						Formaldehyde	0.14	Above Average	EF	50.0%
						Isomers of xylene	0.013	Above Average	EF	50.0%
						Naphthalene	0.00026	Above Average	EF	50.0%
						PAH	0.00043	Above Average	EF	50.0%
						Propylene oxide	0.0057	Marginal	EF	50.0%
						Toluene	0.026	Above Average	EF	50.0%
						TOC	2.17	Above Average	EF	50.0%
						VOC	1.94	Marginal	EC/EF	50.0%

Table 6b - Expected Emissions from all Facility Sources – 80% Natural Gas, 20% Hydrogen Gas

Fuel Mixture: 80% Natural Gas, 20% Hydrogen										
Source Data						Emission Data				
Source ID	Description	Exhaust Flow (kg/s)	Flow Temp. (°C)	Stack Dia. (m)	Height Above Grade (m)	Contaminant	Emission Rate (g/s)	Data Quality	Estimation Type	Percentage of Overall Emission
STCK 2002	HRSG 2002 Stack	461.7	82.2	6.01	43	NO_2	14.96	Above Average	EC	49.7%
						CO	10.17	Above Average	EC	49.8%
						PM	2.39	Above Average	EC	48.9%
						SO_2	0.00	Above Average	EC/EF	N/A
						Acetaldehyde	0.0063	Above Average	EF	50.0%
						Acrolein	0.00101	Above Average	EF	50.0%
						Benzene	0.00189	Above Average	EF	50.0%
						1,3-Butadiene	0.000069	Marginal	EF	50.0%

Fuel Mixture: 80% Natural Gas, 20% Hydrogen										
Source Data						Emission Data				
Source ID	Description	Exhaust Flow (kg/s)	Flow Temp. (°C)	Stack Dia. (m)	Height Above Grade (m)	Contaminant	Emission Rate (g/s)	Data Quality	Estimation Type	Percentage of Overall Emission
						Ethylbenzene	0.0050	Above Average	EF	50.0%
						Formaldehyde	0.112	Above Average	EF	50.0%
						Isomers of xylene	0.010	Above Average	EF	50.0%
						Naphthalene	0.00020	Above Average	EF	50.0%
						PAH	0.00035	Above Average	EF	50.0%
						Propylene oxide	0.0046	Marginal	EF	50.0%
						Toluene	0.020	Above Average	EF	50.0%
						TOC	1.73	Above Average	EF	50.0%
						VOC	0.33	Marginal	EC/EF	50.0%
STCK 2003	HRSG 2003 Stack	461.7	82.2	6.01	43	NO_2	14.96	Above Average	EC	49.7%
						CO	10.17	Above Average	EC	49.8%
						PM	2.39	Above Average	EC	48.9%
						SO_2	0.00	Above Average	EC/EF	N/A
						Acetaldehyde	0.0063	Above Average	EF	50.0%
						Acrolein	0.0010	Above Average	EF	50.0%
						Benzene	0.0019	Above Average	EF	50.0%
						1,3-Butadiene	0.000068	Marginal	EF	50.0%
						Ethylbenzene	0.0050	Above Average	EF	50.0%
						Formaldehyde	0.11	Above Average	EF	50.0%
						Isomers of xylene	0.010	Above Average	EF	50.0%
						Naphthalene	0.00020	Above Average	EF	50.0%
						PAH	0.00035	Above Average	EF	50.0%
						Propylene oxide	0.0046	Marginal	EF	50.0%
						Toluene	0.020	Above Average	EF	50.0%
						TOC	1.73	Above Average	EF	50.0%
						VOC	0.33	Marginal	EC/EF	50.0%

Table 6c - Expected Emissions from all Facility Sources – 35% Natural Gas, 65% Hydrogen Gas

Fuel Mixture: 35% Natural Gas, 65% Hydrogen										
Source Data						Emission Data				
Source ID	Description	Exhaust Flow (kg/s)	Flow Temp. (°C)	Stack Dia. (m)	Height Above Grade (m)	Contaminant	Emission Rate (g/s)	Data Quality	Estimation Type	Percentage of Overall Emission
STCK 2002	HRSG 2002 Stack	459.7	82.2	6.01	43	NO_2	22.31	Above Average	EC	49.8%
						CO	17.36	Above Average	EC	49.9%
						PM	2.39	Above Average	EC	48.9%
						SO_2	0.00	Above Average	EC/EF	N/A
						Acetaldehyde	0.0028	Above Average	EF	50%
						Acrolein	0.00044	Above Average	EF	50%
						Benzene	0.00083	Above Average	EF	50%
						1,3-Butadiene	0.000030	Marginal	EF	50%
						Ethylbenzene	0.0022	Above Average	EF	50%
						Formaldehyde	0.0490	Above Average	EF	50%
						Isomers of xylene	0.0044	Above Average	EF	50%
						Naphthalene	0.0001	Above Average	EF	50%
						PAH	0.00015	Above Average	EF	50%
						Propylene oxide	0.00200	Marginal	EF	50%
						Toluene	0.00896	Above Average	EF	50%
						TOC	0.75852	Above Average	EF	50%
						VOC	1.66940	Marginal	EC/EF	50%
STCK 2003	HRSG 2003 Stack	459.7	82.2	6.01	43	NO_2	22.31	Above Average	EC	49.8%
						CO	17.36	Above Average	EC	49.9%
						PM	2.39	Above Average	EC	48.9%
						SO_2	0.00	Above Average	EC/EF	N/A
						Acetaldehyde	0.0028	Above Average	EF	50.0%
						Acrolein	0.00044	Above Average	EF	50.0%
						Benzene	0.00083	Above Average	EF	50.0%
						1,3-Butadiene	0.000030	Marginal	EF	50.0%
						Ethylbenzene	0.0022	Above Average	EF	50.0%

Fuel Mixture: 35% Natural Gas, 65% Hydrogen										
Source Data						Emission Data				
Source ID	Description	Exhaust Flow (kg/s)	Flow Temp. (°C)	Stack Dia. (m)	Height Above Grade (m)	Contaminant	Emission Rate (g/s)	Data Quality	Estimation Type	Percentage of Overall Emission
						Formaldehyde	0.049	Above Average	EF	50.0%
						Isomers of xylene	0.0044	Above Average	EF	50.0%
						Naphthalene	0.000090	Above Average	EF	50.0%
						PAH	0.00015	Above Average	EF	50.0%
						Propylene oxide	0.0020	Marginal	EF	50.0%
						Toluene	0.0090	Above Average	EF	50.0%
						TOC	0.76	Above Average	EF	50.0%
						VOC	1.67	Marginal	EC/EF	50.0%

Table 6d - Expected Emissions from all other Facility Sources

Source Data						Emission Data				
Source ID	Description	Exhaust Flow (kg/s)	Flow Temp. (°C)	Stack Dia. (m)	Height Above Grade (m)	Contaminant	Emission Rate (g/s)	Data Quality	Estimation Type	Percentage of Overall Emission
CT 2006	Cooling Tower Stack 1	519.1 (m3/s)	32.0	10.6	11.5	PM	0.010	Above Average	EC	0.20%
CT 2007	Cooling Tower Stack 2					PM	0.010	Above Average	EC	0.20%
CT 2008	Cooling Tower Stack 3					PM	0.010	Above Average	EC	0.20%
CT 2009	Cooling Tower Stack 4					PM	0.010	Above Average	EC	0.20%
CT 2010	Cooling Tower Stack 5					PM	0.010	Above Average	EC	0.20%
CT 2011	Cooling Tower Stack 6					PM	0.010	Above Average	EC	0.20%
CT 2012	Cooling Tower Stack 7					PM	0.010	Above Average	EC	0.20%
CT 2013	Cooling Tower Stack 8					PM	0.010	Above Average	EC	0.20%
CT 2014	Cooling Tower Stack 9					PM	0.010	Above Average	EC	0.20%

Source Data						Emission Data				
Source ID	Description	Exhaust Flow (kg/s)	Flow Temp. (°C)	Stack Dia. (m)	Height Above Grade (m)	Contaminant	Emission Rate (g/s)	Data Quality	Estimation Type	Percentage of Overall Emission
	Gas Fired Heater 1	0.0033	N/A	0.15	3	NO_2	0.029	Above Average	EF	0.14%
						CO	0.012	Above Average	EF	0.06%
						PM	0.0023	Marginal	EF	0.048%
						SO_2	0.00018	Above Average	EF	16.7%
	Gas Fired Heater 2	0.0033	N/A	0.15	3	NO_2	0.029	Above Average	EF	0.14%
						CO	0.012	Above Average	EF	0.06%
						PM	0.0023	Marginal	EF	0.048%
						SO_2	0.00018	Above Average	EF	16.7%
	Gas Fired Heater 3	0.0033	N/A	0.15	3	NO_2	0.029	Above Average	EF	0.14%
						CO	0.012	Above Average	EF	0.06%
						PM	0.0023	Marginal	EF	0.048%
						SO_2	0.00018	Above Average	EF	16.7%
	Gas Fired Heater 4	0.0033	N/A	0.15	3	NO_2	0.029	Above Average	EF	0.14%
						CO	0.012	Above Average	EF	0.06%
						PM	0.0023	Marginal	EF	0.048%
						SO_2	0.00018	Above Average	EF	16.7%
	Gas Fired Heater 5	0.0033	N/A	0.15	3	NO_2	0.029	Above Average	EF	0.14%
						CO	0.012	Above Average	EF	0.06%
						PM	0.0023	Marginal	EF	0.048%
						SO_2	0.00018	Above Average	EF	16.7%
	Gas Fired Heater 6	0.0033	N/A	0.15	3	NO_2	0.029	Above Average	EF	0.14%
						CO	0.012	Above Average	EF	0.06%
						PM	0.0023	Marginal	EF	0.048%
						SO_2	0.00018	Above Average	EF	16.7%

Table 7 - Start-up Emission Rates

Source ID	Description	Contaminant3	Cold Start	Warm Start	Hot Start	Data Qulaity[1]	Estimation Type[2]	Percentage of Overall Emission
			Emission Rate (g/s)	Emission Rate (g/s)	Emission Rate (g/s)			
STK 2003	HRSG 2003 Stack	NO_2	17.76	13.59	21.31	Above Average	EC	50%
		CO	28.22	92.81	28.37	Above Average	EC	50%
		SO_2	0.00	0.00	0.00	Above Average	EC	50%
		PM	1.63	1.63	1.63	Above Average	EC	50%
STK 2004	HRSG 2004 Stack	NO_2	17.76	13.59	21.31	Above Average	EC	50%
		CO	28.22	92.81	28.37	Above Average	EC	50%
		SO_2	0.00	0.00	0.00	Above Average	EC	50%
		PM	1.63	1.63	1.63	Above Average	EC	50%

Table 8a - Start-up Followed by Full Load Operation Emission Rates – 100% Natural Gas

100% Natural Gas								
Source ID	Description	Contaminant[3]	Cold Start	Warm Start	Hot Start	Data Qulaity[1]	Estimation Type[2]	Percentage of Overall Emission
			Emission Rate (g/s)	Emission Rate (g/s)	Emission Rate (g/s)			
STK 2003	HRSG 2003 Stack	NO_2	12.13	10.84	11.14	Above Average	EC	50%
		CO	14.20	19.18	11.24	Above Average	EC	50%
		SO_2	0.00	0.00	0.00	Above Average	EC	50%
		PM	2.22	2.31	2.35	Above Average	EC	50%
STK 2004	HRSG 2004 Stack	NO_2	12.13	10.84	11.14	Above Average	EC	50%
		CO	14.20	19.18	11.24	Above Average	EC	50%
		SO_2	0.00	0.00	0.00	Above Average	EC	50%
		PM	2.22	2.31	2.35	Above Average	EC	50%

Table 8b - Start-up Followed by Full Load Operation Emission Rates – 80% Natural Gas, 20% Hydrogen Gas

80% Natural Gas, 20% Hydrogen								
Source ID	Description	Contaminant[3]	Cold Start Emission Rate (g/s)	Warm Start Emission Rate (g/s)	Hot Start Emission Rate (g/s)	Data Qulaity[1]	Estimation Type[2]	Percentage of Overall Emission
STK 2003	HRSG 2003 Stack	NO_2	15.58	14.81	15.33	Above Average	EC	50%
		CO	14.19	19.18	11.23	Above Average	EC	50%
		SO_2	0.00	0.00	0.00	Above Average	EC	50%
		PM	2.22	2.31	2.35	Above Average	EC	50%
STK 2004	HRSG 2004 Stack	NO_2	15.58	14.81	15.33	Above Average	EC	50%
		CO	14.19	19.18	11.23	Above Average	EC	50%
		SO_2	0.00	0.00	0.00	Above Average	EC	50%
		PM	2.22	2.31	2.35	Above Average	EC	50%

Table 8c - Start-up Followed by Full Load Operation Emission Rates – 35% Natural Gas, 65% Hydrogen Gas

35% Natural Gas, 65% Hydrogen								
Source ID	Description	Contaminant[3]	Cold Start Emission Rate (g/s)	Warm Start Emission Rate (g/s)	Hot Start Emission Rate (g/s)	Data Qulaity[1]	Estimation Type[2]	Percentage of Overall Emission
STK 2003	HRSG 2003 Stack	NO_2	21.30	21.36	22.26	Above Average	EC	50%
		CO	19.78	25.58	18.00	Above Average	EC	50%
		SO_2	0.00	0.00	0.00	Above Average	EC	50%
		PM	2.22	2.31	2.35	Above Average	EC	50%
STK 2004	HRSG 2004 Stack	NO_2	21.30	21.36	22.26	Above Average	EC	50%
		CO	19.78	25.58	18.00	Above Average	EC	50%
		SO_2	0.00	0.00	0.00	Above Average	EC	50%
		PM	2.22	2.31	2.35	Above Average	EC	50%

Notes for Tables 6x, 7, and 8:

1. Data quality or emission factor rating is a qualitative measure of uncertainty of the emission factor.
2. EC = engineering calculations, EF = USA EPA emission factor
3. Emission rates for NO_2, CO, PM, SO_2 are from gas turbine manufacturer. These emission rates are considered having an average rating of uncertainty (i.e., 'C' rating). PM (particulate matter) assumed to be 100% $PM_{2.5}$.

Table 9a - Start-up Followed by Full Load Operation Maximum Emission Rates – 100% Natural Gas

100% Natural Gas				
Source ID	Description	Contaminant[3]	Start up followed by full load operation Maximum Emission Rate (g/s)	Start up Condition Used
STK 2003	HRSG 2003 Stack	NO_2	12.13	Cold Start
		CO	19.18	Warm Start
		SO_2	0.00	N/A
		PM	2.35	N/A
STK 2004	HRSG 2004 Stack	NO_2	12.13	Cold Start
		CO	19.18	Warm Start
		SO_2	0.00	N/A
		PM	2.35	N/A

Table 9b - Start-up Followed by Full Load Operation Maximum Emission Rates – 80% Natural Gas, 20% Hydrogen Gas

80% Natural Gas, 20% Hydrogen				
Source ID	Description	Contaminant[3]	Start up followed by full load operation Maximum Emission Rate (g/s)	Start up Condition Used
STK 2003	HRSG 2003 Stack	NO_2	15.58	Cold Start
		CO	19.18	Warm Start
		SO_2	0.00	N/A
		PM	2.35	N/A
STK 2004	HRSG 2004 Stack	NO_2	15.58	Cold Start
		CO	19.18	Warm Start
		SO_2	0.00	N/A
		PM	2.35	N/A

Table 9c - Start-up Followed by Full Load Operation Maximum Emission Rates – 35% Natural Gas, 65% Hydrogen Gas

35% Natural Gas, 65% Hydrogen				
Source ID	Description	Contaminant[3]	Start up followed by full load operation Maximum Emission Rate (g/s)	Start up Condition Used
STK 2003	HRSG 2003 Stack	NO_2	22.26	Hot Start
		CO	25.58	Warm Start
		SO_2	0.00	N/A
		PM	2.35	N/A
STK 2004	HRSG 2004 Stack	NO_2	22.26	Hot Start
		CO	25.58	Warm Start
		SO_2	0.00	N/A
		PM	2.35	N/A

9.2 Annual Emissions

Table 10 below shows the expected total annual emission for the proposed power plant with supplementary hydrogen gas and duct firing, using Table 9 emission rates. The annual emissions are based on the expected operating time of 25% of the total yearly hours. Note that PM (particulate matter) is assumed to be 100% PM2.5.

Table 10 - Expected Total Annual Emissions (with duct firing)

Contaminant[3]	100% Natural Gas	80% Natural Gas, 20% Hydrogen	35% Natural Gas, 65% Hydrogen
	Annual Emissions (tonne)	Annual Emissions (tonne)	Annual Emissions (tonne)
NO_2	95.6	122.9	175.5
CO	151.2	151.2	201.7
SO_2	0.0	0.0	0.0
PM	18.5	18.5	18.5

9.3 Compliance with Point of Impingement Criteria

The maximum concentrations projected by AERMOD for the two operating scenarios (full load operation and start-up, followed by full load operation) were evaluated for compliance with applicable POI criteria. Tables 11 and 12 compare, for each of the two operating scenarios, the expected maximum contaminant concentrations, according to the averaging period for the relevant MECP POI Limit corresponding to that contaminant, against the applicable POI criteria. These tables show that all POI criteria will be met under all operating scenarios at the point of maximum ground level concentration.

Table 11 - Emission Summary Table (Full Load Operation)

100 % Natural Gas							
Contaminant Name	Contaminant CAS Number	Total Facility Emission Rate (g/s)	Air Dispersion Model Used	Max. POI Concentration (µg/m^3)	Averaging Period	MECP POI Limit (µg/m^3)	Percentage of MECP POI limit
NO_2	10102-44-0	21.02	AERMOD	55.40	1 h	400	13.8%
		9.55		10.51	24 h	200	5.3%
CO	630-08-0	20.35	AERMOD	64.37	0.5 hr	6000	1.1%
SO_2	7446-09-05	0.00	AERMOD	0.00	1 h	690	0.0%
		0.00		0.00	24 h	275	0.0%
PM	NA	2.17	AERMOD	2.39	24 hr	120	2.0%
Benzene	71-43-2	0.00215	AERMOD	0.0000209	Annual	0.45	0.0%
1,3 Butadiene	106-99-0	0.0000770	AERMOD	0.000000749	Annual	2	
Ethyl Benzene	100-41-4	0.00573	AERMOD	0.00631	24 h	1000	0.0%
Toluene	108-88-3	0.051	AERMOD	N/A	N/A	N/A	N/A
Xylenes	1330-20-7	0.0115	AERMOD	0.0126	24 h	730	0.0%
80 % Natural Gas, 20% Hydrogen Gas							
Contaminant Name	Contaminant CAS Number	Total Facility Emission Rate (g/s)	Air Dispersion Model Used	Max. POI Concentration (µg/m^3)	Averaging Period	MECP POI Limit (µg/m^3)	Percentage of MECP POI limit
NO_2	10102-44-0	29.92	AERMOD	78.87	1 h	400	19.7%
		13.59		14.97	24 h	200	7.5%
CO	630-08-0	20.34	AERMOD	64.34	0.5 hr	6000	1.1%
SO_2	7446-09-05	0.00	AERMOD	0.00	1 h	690	0.0%
		0.00		0.00	24 h	275	0.0%
PM	NA	2.17	AERMOD	2.39	24 hr	120	2.0%
Benzene	71-43-2	0.00172	AERMOD	0.0000167	Annual	0.45	0.0%
1,3 Butadiene	106-99-0	0.0000616	AERMOD	0.000000599	Annual	2	0.0%
Ethyl Benzene	100-41-4	0.00458	AERMOD	0.00505	24 h	1000	0.0%
Toluene	108-88-3	0.04098	AERMOD	N/A	N/A	N/A	N/A
Xylenes	1330-20-7	0.00916	AERMOD	0.0101	24 h	730	0.0%
35 % Natural Gas, 65% Hydrogen Gas							
Contaminant Name	Contaminant CAS Number	Total Facility Emission Rate (g/s)	Air Dispersion Model Used	Max. POI Concentration (µg/m^3)	Averaging Period	MECP POI Limit (µg/m^3)	Percentage of MECP POI limit
NO_2	10102-44-0	44.63	AERMOD	117.63	1 h	400	29.4%
		20.27		22.33	24 h	200	11.2%
CO	630-08-0	34.72	AERMOD	109.83	0.5 hr	6000	1.8%
SO_2	7446-09-05	0.00	AERMOD	0.00	1 h	690	0.0%
		0.00		0.00	24 h	275	0.0%
PM	NA	2.17	AERMOD	2.39	24 hr	120	2.0%
Benzene	71-43-2	0.000752	AERMOD	0.00000731	Annual	0.45	0.0%
1,3 Butadiene	106-99-0	0.0000269	AERMOD	0.000000262	Annual	2	0.0%
Ethyl Benzene	100-41-4	0.00200	AERMOD	0.00221	24 h	1000	0.0%
Toluene	108-88-3	0.0179	AERMOD	N/A	N/A	N/A	N/A
Xylenes	1330-20-7	0.00401	AERMOD	0.0044	24 h	730	0.0%

Table 12 - Emission Summary Table (Maximum Emission Scenario - Startup followed by Full Load)

100 % Natural Gas							
Contaminant Name	Contaminant CAS Number	Total Facility Emission Rate (g/s)	Air Dispersion Model Used	Max. POI Concentration (µg/m^3)	Averaging Period	MECP POI Limit (µg/m^3)	Percentage of MECP POI limit
NO_2	10102-44-0	24.25	AERMOD	63.92	1 h	400	16.0%
		11.01		12.13	24 h	200	6.1%
CO	630-08-0	38.36	AERMOD	121.34	0.5 hr	6000	2.0%
SO_2	7446-09-05	0.00	AERMOD	0.00	1 h	690	0.0%
		0.00		0.00	24 h	275	0.0%
PM	NA	2.13	AERMOD	2.35	24 hr	120	2.0%
Benzene	71-43-2	0.00215	AERMOD	0.0000209	Annual	0.45	0.0%
1,3 Butadiene	106-99-0	0.0000770	AERMOD	0.000000749	Annual	2	0.0%
Ethyl Benzene	100-41-4	0.00573	AERMOD	0.00631	24 h	1000	0.0%
Toluene	108-88-3	0.051	AERMOD	N/A	N/A	N/A	N/A
Xylenes	1330-20-7	0.0115	AERMOD	0.0126	24 h	730	0.0%
80 % Natural Gas, 20% Hydrogen Gas							
Contaminant Name	Contaminant CAS Number	Total Facility Emission Rate (g/s)	Air Dispersion Model Used	Max. POI Concentration (µg/m^3)	Averaging Period	MECP POI Limit (µg/m^3)	Percentage of MECP POI limit
NO_2	10102-44-0	31.17	AERMOD	82.16	1 h	400	20.5%
		14.16		15.59	24 h	200	7.8%
CO	630-08-0	19.18	AERMOD	60.66	0.5 hr	6000	1.0%
SO_2	7446-09-05	0.00	AERMOD	0.00	1 h	690	0.0%
		0.00		0.00	24 h	275	0.0%
PM	NA	2.13	AERMOD	2.35	24 hr	120	2.0%
Benzene	71-43-2	0.00172	AERMOD	0.0000167	Annual	0.45	0.0%
1,3 Butadiene	106-99-0	0.0000616	AERMOD	0.000000599	Annual	2	0.0%
Ethyl Benzene	100-41-4	0.00458	AERMOD	0.00505	24 h	1000	0.0%
Toluene	108-88-3	0.04098	AERMOD	N/A	N/A	N/A	N/A
Xylenes	1330-20-7	0.00916	AERMOD	0.0101	24 h	730	0.0%
35 % Natural Gas, 65% Hydrogen Gas							
Contaminant Name	Contaminant CAS Number	Total Facility Emission Rate (g/s)	Air Dispersion Model Used	Max. POI Concentration (µg/m^3)	Averaging Period	MECP POI Limit (µg/m^3)	Percentage of MECP POI limit
NO_2	10102-44-0	44.51	AERMOD	117.32	1 h	400	29.3%
		20.22		22.27	24 h	200	11.1%
CO	630-08-0	51.17	AERMOD	161.84	0.5 hr	6000	2.7%
SO_2	7446-09-05	0.00	AERMOD	0.00	1 h	690	0.0%
		0.00		0.00	24 h	275	0.0%
PM	NA	2.13	AERMOD	2.35	24 hr	120	2.0%
Benzene	71-43-2	0.000752	AERMOD	0.00000731	Annual	0.45	0.0%
1,3 Butadiene	106-99-0	0.0000269	AERMOD	0.000000262	Annual	2	0.0%
Ethyl Benzene	100-41-4	0.00200	AERMOD	0.00221	24 h	1000	0.0%
Toluene	108-88-3	0.0179	AERMOD	N/A	N/A	N/A	N/A
Xylenes	1330-20-7	0.00401	AERMOD	0.0044	24 h	730	0.0%

9.4 Accumulative Assessment and Ambient Air Quality Criteria

Tables 13a, 13b and 13c compare, for each of the two operating scenarios, the one-hour contaminant concentrations projected by the AERMOD model from the facility with the 90th percentile local air quality data, against all applicable one-hour Ambient Air Quality Criteria. This table shows that all one-hour Ambient Air Quality Criteria will be met under all operating scenarios at the point of maximum ground level concentration for the MECP AAQC. The CCME 1-hour CAAQS for NO_2 was used also used for comparison purposes only, which will provide addition context for potential air quality impacts. The 42 ppb (82 ug/m^3) CAAQS uses a 3-year average of the annual 98th percentile of the daily maximum 1-hour average concentration, which is not required for this assessment.

The MECP Ambient Air Quality Criteria will not be exceeded due to the Hydrogen Ready facility emissions even when ambient air quality is at its poorest in terms of the concentrations of the relevant contaminants.

Table 13a - Dispersion Modeling Results - 100% Natural Gas MECP 1 h AAQC and CAAQS

100% Natural Gas								
Scenario	Species	1 hr AAQC (µg/m^3)	2025 1 h CAAQS (ug/m^3)	Maximum 1 hr Concentration (Off property) (µg/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
					Ambient Levels (µg/m^3)	Combined Effect (µg/m^3)	Ambient Levels (µg/m^3)	Combined Effect (µg/m^3)
Scenario 1 Full Load Operation	NO_2	400	82	55.40	31.04	86.44	33.86	89.26
	CO	36200	N/A	107.28	692.96	800.24	771.29	878.57
	PM2.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	SO_2	106	N/A	0.00	10.72	10.72	11.73	11.73
	Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	1,3 Butadiene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scenario 2 Start-up Followed by Full Load Operation	NO_2	400	82	63.92	31.04	94.97	33.86	97.78
	CO	36200	N/A	202.24	692.96	895.19	771.29	973.53
	PM2.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	SO_2	106	N/A	0.00	10.72	10.72	11.73	11.73
	Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	1,3 Butadiene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 13b - Dispersion Modeling Results - 80% Natural Gas/20% Hydrogen Gas MECP 1 h AAQC and CAAQS

80% Natural Gas, 20% Hydrogen Gas								
Scenario	Species	1 hr AAQC ($\mu g/m^3$)	2025 1 h CAAQS (ug/m^3)	Maximum 1 hr Concentration (Off property) ($\mu g/m^3$)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
					Ambient Levels ($\mu g/m^3$)	Combined Effect ($\mu g/m^3$)	Ambient Levels ($\mu g/m^3$)	Combined Effect ($\mu g/m^3$)
Scenario 1 Full Load Operation	NO_2	400	82	78.87	31.04	109.91	33.86	112.72
	CO	36200	N/A	107.23	692.96	800.18	771.29	878.52
	PM2.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	SO_2	106	N/A	0.00	10.72	10.72	11.73	11.73
	Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	1,3 Butadiene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scenario 2 Start-up Followed by Full Load Operation	NO_2	400	82	82.16	31.04	113.20	33.86	116.01
	CO	36200	N/A	101.09	692.96	794.05	771.29	872.39
	PM2.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	SO_2	106	N/A	0.00	10.72	10.72	11.73	11.73
	Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	1,3 Butadiene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 13c - Dispersion Modeling Results - 35% Natural Gas/65% Hydrogen Gas MECP 1 h AAQC and CAAQS

35% Natural Gas, 65% Hydrogen Gas								
Scenario	Species	1 hr AAQC ($\mu g/m^3$)	2025 1 h CAAQS (ug/m^3)	Maximum 1 hr Concentration (Off property) ($\mu g/m^3$)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
					Ambient Levels ($\mu g/m^3$)	Combined Effect ($\mu g/m^3$)	Ambient Levels ($\mu g/m^3$)	Combined Effect ($\mu g/m^3$)
Scenario 1 Full Load Operation	NO_2	400	82	117.63	31.04	148.68	33.86	151.49
	CO	36200	N/A	183.04	692.96	876.00	771.29	954.33
	PM2.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	SO_2	106	N/A	0.00	10.72	10.72	11.73	11.73
	Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	1,3 Butadiene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scenario 2 Start-up Followed by Full Load Operation	NO_2	400	82	117.32	31.04	148.37	33.86	151.18
	CO	36200	N/A	269.74	692.96	962.70	771.29	1041.03
	PM2.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	SO_2	106	N/A	0.00	10.72	10.72	11.73	11.73
	Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	1,3 Butadiene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A

As shown in Tables 14a, 14b and 14c, the assessment of the 8-hour impact at the point of maximum CO concentration shows that the maximum 8-hour ground level CO concentration due to the facility will be 205.31 µg/m^3, which when combined with the maximum local ambient level for CO of 1854.85 µg/m^3, will be less than the 8-hour AAQC for CO of 15700 µg/m^3.

Table 14a: Dispersion Modeling Results - 100% Natural Gas, MECP 8 h AAQC

100% Natural Gas							
Scenario	Species	8 hr AAQC (µg/m^3)	Maximum 8 hr Concentration (Off property) (µg/m^3)	Average 90th Percentile (2000 through 2001)		Maximum 90th Percentile (2000 through 2001)	
				Ambient Levels (µg/m^3)	Combined Effect (µg/m^3)	Ambient Levels (µg/m^3)	Combined Effect (µg/m^3)
Scenario 1 Full Load Operation	NO_2	N/A	N/A	N/A	N/A	N/A	N/A
	CO	15700	80.91	1530.5	1611.44	1649.5	1730.44
	PM2.5	N/A	N/A	N/A	N/A	N/A	N/A
	SO_2	N/A	N/A	N/A	N/A	N/A	N/A
	Benzene	N/A	N/A	N/A	N/A	N/A	N/A
	1,3 Butadiene	N/A	N/A	N/A	N/A	N/A	N/A
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A
Scenario 2 Start-up Followed by Full Load Operation	NO_2	N/A	N/A	N/A	N/A	N/A	N/A
	CO	15700	153.93	1530.5	1684.46	1649.5	1803.47
	PM2.5	N/A	N/A	N/A	N/A	N/A	N/A
	SO_2	N/A	N/A	N/A	N/A	N/A	N/A
	Benzene	N/A	N/A	N/A	N/A	N/A	N/A
	1,3 Butadiene	N/A	N/A	N/A	N/A	N/A	N/A
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A

Table 14b: Dispersion Modeling Results - 80% Natural Gas/20% Hydrogen MECP 8 h AAQC

80% Natural Gas, 20% Hydrogen Gas							
Scenario	Species	8 hr AAQC (µg/m³)	Maximum 8 hr Concentration (Off property) (µg/m³)	Average 90th Percentile (2000 through 2001)		Maximum 90th Percentile (2000 through 2001)	
				Ambient Levels (µg/m³)	Combined Effect (µg/m³)	Ambient Levels (µg/m³)	Combined Effect (µg/m³)
Scenario 1 Full Load Operation	NO_2	N/A	N/A	N/A	N/A	N/A	N/A
	CO	15700	81.62	1530.5	1612.15	1649.5	1731.15
	PM2.5	N/A	N/A	N/A	N/A	N/A	N/A
	SO_2	N/A	N/A	N/A	N/A	N/A	N/A
	Benzene	N/A	N/A	N/A	N/A	N/A	N/A
	1,3 Butadiene	N/A	N/A	N/A	N/A	N/A	N/A
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A
Scenario 2 Start-up Followed by Full Load Operation	NO_2	N/A	N/A	N/A	N/A	N/A	N/A
	CO	15700	76.95	1530.5	1607.48	1649.5	1726.49
	PM2.5	N/A	N/A	N/A	N/A	N/A	N/A
	SO_2	N/A	N/A	N/A	N/A	N/A	N/A
	Benzene	N/A	N/A	N/A	N/A	N/A	N/A
	1,3 Butadiene	N/A	N/A	N/A	N/A	N/A	N/A
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A

Table 14c: Dispersion Modeling Results - 35% Natural Gas/65% Hydrogen MECP 8 h AAQC

35% Natural Gas, 65% Hydrogen Gas							
Scenario	Species	8 hr AAQC ($\mu g/m^3$)	Maximum 8 hr Concentration (Off property) ($\mu g/m^3$)	Average 90th Percentile (2000 through 2001)		Maximum 90th Percentile (2000 through 2001)	
				Ambient Levels ($\mu g/m^3$)	Combined Effect ($\mu g/m^3$)	Ambient Levels ($\mu g/m^3$)	Combined Effect ($\mu g/m^3$)
Scenario 1 Full Load Operation	NO_2	N/A	N/A	N/A	N/A	N/A	N/A
	CO	15700	139.32	1530.5	1669.85	1649.5	1788.86
	PM2.5	N/A	N/A	N/A	N/A	N/A	N/A
	SO_2	N/A	N/A	N/A	N/A	N/A	N/A
	Benzene	N/A	N/A	N/A	N/A	N/A	N/A
	1,3 Butadiene	N/A	N/A	N/A	N/A	N/A	N/A
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A
Scenario 2 Start-up Followed by Full Load Operation	NO_2	N/A	N/A	N/A	N/A	N/A	N/A
	CO	15700	205.31	1530.5	1735.84	1649.5	1854.85
	PM2.5	N/A	N/A	N/A	N/A	N/A	N/A
	SO_2	N/A	N/A	N/A	N/A	N/A	N/A
	Benzene	N/A	N/A	N/A	N/A	N/A	N/A
	1,3 Butadiene	N/A	N/A	N/A	N/A	N/A	N/A
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A

Tables 15a, 15b and 15c show that the applicable 24-hour AAQC will be met at the point of maximum ground level concentration. Table 15 also shows that the maximum 24-hour local ambient concentration of PM2.5 is already in excess of the MECP AAQC. PM2.5 start-up condition emission rate was assumed to be equal to the full load emission rate as listed in Table 6 (see US EPA AP-42, Section 3.1). There were no data on the ambient PM10 concentrations at the MECP air monitoring station for the years 2016 through 2020.

Table 15a - Dispersion Modeling Results - 100% Natural Gas MECP 24 h AAQC

100% Natural Gas							
Scenario	Species	24 hr AAQC (µg/m^3)	Maximum 24 hr Concentration (Off property) (µg/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
				Ambient Levels (µg/m^3)	Combined Effect (µg/m^3)	Ambient Levels (µg/m^3)	Combined Effect (µg/m^3)
Scenario 1 Full Load Operation	NO_2	200	10.51	46.7	57.19	50.9	61.40
	CO	N/A	N/A	N/A	N/A	N/A	N/A
	PM2.5	27	2.39	27.9	30.30	31.9	34.31
	SO_2	N/A	N/A	N/A	N/A	N/A	N/A
	Benzene	2.3	0.00473	1.16	1.16	1.71	1.72
	1,3 Butadiene	10	0.000170	0.21	0.21	0.34	0.34
	Ethyl Benzene	1000	0.0063	0.43	0.44	0.76	0.77
	Toluene	2000	0.05125	2.40	2.46	3.69	3.74
	Xylenes	730	0.0126	0.98	0.99	1.25	1.26
Scenario 2 Start-up Followed by Full Load Operation	NO_2	200	12.13	46.7	58.80	50.9	63.01
	CO	N/A	N/A	N/A	N/A	N/A	N/A
	PM2.5	27	2.35	27.9	30.26	31.9	34.27
	SO_2	N/A	N/A	N/A	N/A	N/A	N/A
	Benzene	2.3	0.00473	1.16	1.16	1.71	1.72
	1,3 Butadiene	10	0.00017	0.21	0.21	0.34	0.34
	Ethyl Benzene	1000	0.00631	0.43	0.44	0.76	0.77
	Toluene	2000	0.0513	2.40	2.46	3.69	3.74
	Xylenes	730	0.0126	0.98	0.99	1.25	1.26

Table 15b - Dispersion Modeling Results - 80% Natural Gas/20% Hydrogen Gas MECP 24 h AAQC

80% Natural Gas, 20% Hydrogen Gas							
Scenario	Species	24 hr AAQC ($\mu g/m^3$)	Maximum 24 hr Concentration (Off property) ($\mu g/m^3$)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
				Ambient Levels ($\mu g/m^3$)	Combined Effect ($\mu g/m^3$)	Ambient Levels ($\mu g/m^3$)	Combined Effect ($\mu g/m^3$)
Scenario 1 Full Load Operation	NO_2	200	14.97	46.7	61.64	50.9	65.85
	CO	N/A	N/A	N/A	N/A	N/A	N/A
	PM2.5	27	2.39	27.9	30.30	31.9	34.31
	SO_2	N/A	N/A	N/A	N/A	N/A	N/A
	Benzene	2.3	0.00378	1.16	1.16	1.71	1.71
	1,3 Butadiene	10	0.000136	0.21	0.21	0.34	0.34
	Ethyl Benzene	1000	0.00505	0.43	0.44	0.76	0.77
	Toluene	2000	0.0410	2.40	2.44	3.69	3.73
	Xylenes	730	0.0101	0.98	0.99	1.25	1.26
Scenario 2 Start-up Followed by Full Load Operation	NO_2	200	15.59	46.7	62.26	50.9	66.48
	CO	N/A	N/A	N/A	N/A	N/A	N/A
	PM2.5	27	2.35	27.9	30.26	31.9	34.27
	SO_2	N/A	N/A	N/A	N/A	N/A	N/A
	Benzene	2.3	0.00378	1.16	1.16	1.71	1.71
	1,3 Butadiene	10	0.00014	0.21	0.21	0.34	0.34
	Ethyl Benzene	1000	0.00505	0.43	0.44	0.76	0.77
	Toluene	2000	0.0410	2.40	2.44	3.69	3.73
	Xylenes	730	0.0101	0.98	0.99	1.25	1.26

Table 15c - Dispersion Modeling Results - 35% Natural Gas/65% Hydrogen Gas MECP 24 h AAQC

35% Natural Gas, 65% Hydrogen Gas							
Scenario	Species	24 hr AAQC ($\mu g/m^3$)	Maximum 24 hr Concentration (Off property) ($\mu g/m^3$)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
				Ambient Levels ($\mu g/m^3$)	Combined Effect ($\mu g/m^3$)	Ambient Levels ($\mu g/m^3$)	Combined Effect ($\mu g/m^3$)
Scenario 1 Full Load Operation	NO_2	200	22.33	46.7	69.00	50.9	73.21
	CO	N/A	N/A	N/A	N/A	N/A	N/A
	PM2.5	27	2.39	27.9	30.30	31.9	34.31
	SO_2	N/A	N/A	N/A	N/A	N/A	N/A
	Benzene	2.3	0.00166	1.16	1.16	1.71	1.71
	1,3 Butadiene	10	0.0000593	0.21	0.21	0.34	0.34
	Ethyl Benzene	1000	0.00221	0.43	0.44	0.76	0.77
	Toluene	2000	0.0179	2.40	2.42	3.69	3.71
	Xylenes	730	0.00442	0.98	0.98	1.25	1.25
Scenario 2 Start-up Followed by Full Load Operation	NO_2	200	22.27	46.7	68.94	50.9	73.15
	CO	N/A	N/A	N/A	N/A	N/A	N/A
	PM2.5	27	2.35	27.9	30.26	31.9	34.27
	SO_2	N/A	N/A	N/A	N/A	N/A	N/A
	Benzene	2.3	0.00166	1.16	1.16	1.7	1.71
	1,3 Butadiene	10	0.00006	0.21	0.21	0.3	0.34
	Ethyl Benzene	1000	0.00221	0.43	0.44	0.8	0.77
	Toluene	2000	0.01794	2.40	2.42	3.7	3.71
	Xylenes	730	0.00442	0.98	0.98	1.2	1.25

Table 16a - Dispersion Modeling Results - 100% Natural Gas MECP Annual AAQC and Annual CAAQS

100% Natural Gas								
Scenario	Species	Annual AAQC (µg/m^3)	2025 Annual CAAQS (µg/m^3)	Maximum Annual Concentration (Off property) (µg/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
					Ambient Levels (µg/m^3)	Combined Effect (µg/m^3)	Ambient Levels (µg/m^3)	Combined Effect (µg/m^3)
Scenario 1 Full Load Operation	NO_2	N/A	24	0.093	13.87	13.96	15.00	15.10
	CO	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	PM2.5	8.80	N/A	0.0211	7.10	7.12	7.35	7.38
	SO_2	10.64	N/A	0.00	5.04	5.04	5.44	5.44
	Benzene	0.45	N/A	0.0000209	0.57	0.57	0.70	0.70
	1,3 Butadiene	2	N/A	0.000000749	0.073	0.073	0.089	0.089
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scenario 2 Start-up Followed by Full Load Operation	NO_2	N/A	24	0.107	13.87	13.98	15.00	15.11
	CO	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	PM2.5	8.80	N/A	0.0208	7.10	7.12	7.35	7.38
	SO_2	10.64	N/A	0.00	5.04	5.04	5.44	5.44
	Benzene	0.45	N/A	0.0000209	0.57	0.57	0.70	0.70
	1,3 Butadiene	2	N/A	0.000000749	0.07	0.073	0.09	0.089
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 16b - Dispersion Modeling Results - 80% Natural Gas/20% Hydrogen Gas MECP Annual AAQC and Annual CAAQS

80% Natural Gas, 20% Hydrogen Gas								
Scenario	Species	Annual AAQC ($\mu g/m^3$)	2025 Annual CAAQS ($\mu g/m^3$)	Maximum Annual Concentration (Off property) ($\mu g/m^3$)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
					Ambient Levels ($\mu g/m^3$)	Combined Effect ($\mu g/m^3$)	Ambient Levels ($\mu g/m^3$)	Combined Effect ($\mu g/m^3$)
Scenario 1 Full Load Operation	NO_2	N/A	24	0.13	13.87	14.00	15.00	15.13
	CO	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	PM2.5	8.80	N/A	0.0211	7.10	7.12	7.35	7.38
	SO_2	10.64	N/A	0.00	5.04	5.04	5.44	5.44
	Benzene	0.45	N/A	0.0000167	0.57	0.57	0.70	0.70
	1,3 Butadiene	2	N/A	0.000000599	0.07	0.073	0.09	0.09
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scenario 2 Start-up Followed by Full Load Operation	NO_2	N/A	24	0.14	13.87	14.01	15.00	15.14
	CO	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	PM2.5	8.80	N/A	0.0208	7.10	7.12	7.35	7.38
	SO_2	10.64	N/A	0.00	5.04	5.04	5.44	5.44
	Benzene	0.45	N/A	0.0000167	0.57	0.57	0.70	0.70
	1,3 Butadiene	2	N/A	0.000000599	0.07	0.07	0.09	0.09
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 16c - Dispersion Modeling Results - 35% Natural Gas/65% Hydrogen Gas MECP Annual AAQC and CAAQS

35% Natural Gas, 65% Hydrogen Gas								
Scenario	Species	Annual AAQC ($\mu g/m^3$)	2025 Annual CAAQS ($\mu g/m^3$)	Maximum Annual Concentration (Off property) ($\mu g/m^3$)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
					Ambient Levels ($\mu g/m^3$)	Combined Effect ($\mu g/m^3$)	Ambient Levels ($\mu g/m^3$)	Combined Effect ($\mu g/m^3$)
Scenario 1 Full Load Operation	NO_2	N/A	24	0.20	13.87	14.07	15.00	15.20
	CO	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	PM2.5	8.80	N/A	0.0211	7.10	7.12	7.35	7.38
	SO_2	10.64	N/A	0.00	5.04	5.04	5.44	5.44
	Benzene	0.45	N/A	0.0000073133	0.57	0.57	0.70	0.70
	1,3 Butadiene	2	N/A	0.00000026206	0.07	0.07	0.09	0.09
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scenario 2 Start-up Followed by Full Load Operation	NO_2	N/A	24	0.20	13.87	14.07	15.00	15.20
	CO	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	PM2.5	8.80	N/A	0.0208	7.10	7.12	7.35	7.38
	SO_2	10.64	N/A	0.00	5.04	5.04	5.44	5.44
	Benzene	0.45	N/A	0.00000731	0.57	0.57	0.70	0.70
	1,3 Butadiene	2	N/A	0.000000262	0.07	0.07	0.09	0.09
	Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Toluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Xylenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A

9.5 Indirect Air Quality Impacts and Contribution to Regional Smog

NOx emitted by the project will potentially react in the presence of sunlight to produce ozone, at some location downwind of the facility. The rate at which this reaction would occur is dependent on regional and continental meteorological conditions, the regional and continental intensity and duration of sunlight, and the regional and continental mixing patterns of NOx from all regional and continental sources, and the regional and continental concentrations of ozone from other emission sources. Accurate modeling of this atmospheric reaction is therefore very complex and not warranted given the limited impact that the project could have on local or regional smog levels.

As an adequate gauge of the likely impact of the project on local or regional smog it is useful to examine the NOx concentrations due to the project during most smog events (e.g., May through September). The provincial NOx emission in 2018 was about 279 kilotonnes ("Air Quality Report", 2018, MECP), as compared to the total annual NOx emission of 395.2 tonnes to be emitted by the project (see Table 10, above). Given the project's potential annual NOx contribution is only 0.14% of the total provincial NOx annual emissions, the project can be concluded to represent an insignificant NOx contribution on a province-wide. Therefore, any incremental impact of NOx emissions from the project on O_3 formation would be insignificant when compared to other sources. As a result, the project is not likely to have any noticeable impact on the regional or continental concentration of ground level ozone.

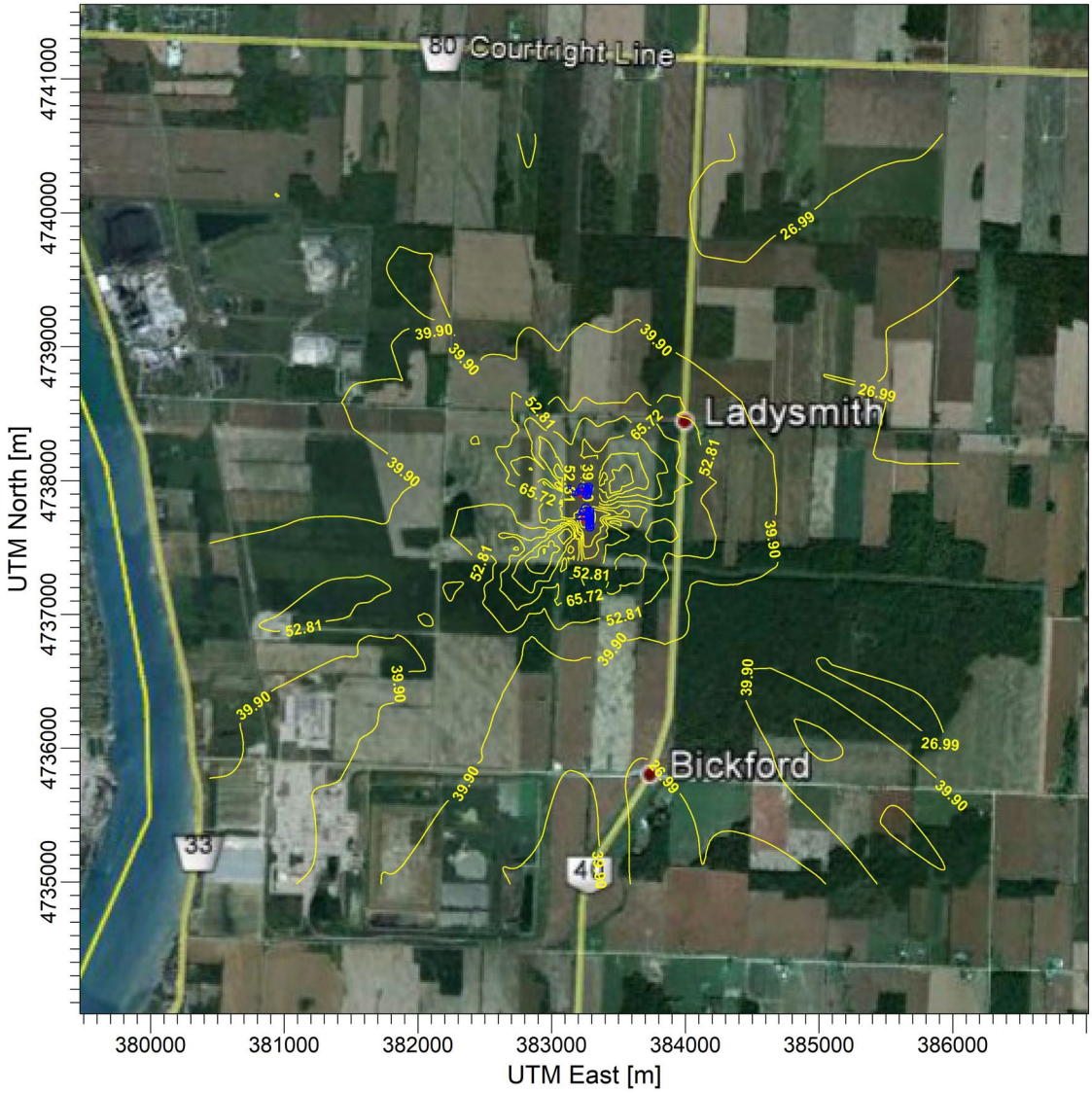
Figures 5 through 7 use isopleths (lines joining locations of equal contaminant concentration) to show the geographic distribution of the expected maximum hourly ground level concentrations as predicted by the AERMOD model when using the meteorological data set for London that is provided by the MECP for running AERMOD.

The three isopleth diagrams show the results of the worst-case emission scenarios (start-up, followed by full load operation). These figures show that the highest hourly ground level concentrations are expected to occur in three zones located from 360 to 420 m from the stack, and that most of the areas of these local zones would be located to the southeast and southwest of the stack.

Figure 5 - NO_2 1 h Maximum Concentration Isopleths

PROJECT TITLE:

Hydrogen Ready Power Project
Dispersion Modeling Multi-Tier Receptor Grid

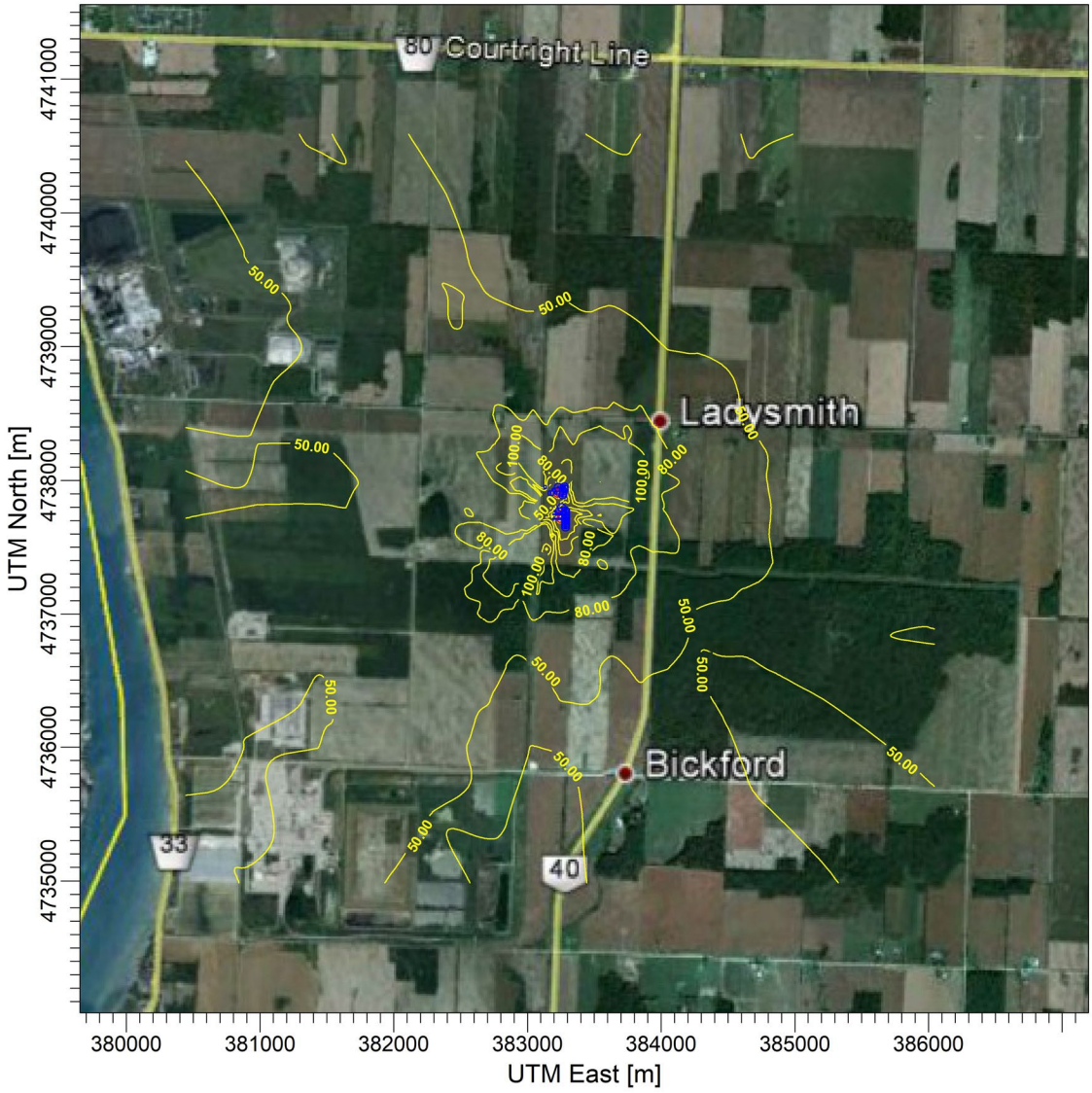


COMMENTS: Operating Scenario Hot Start Followed by Full Load 35% NG / 65% Hydrogen Gas	SOURCES: **2**	COMPANY NAME: **Eastern Power Inc.**	
	RECEPTORS: **1161**	MODELER: **FCI**	
	OUTPUT TYPE: **Concentration**	SCALE: 0 1:55,000 2 km	
	MAX: **117 ug/m^3**	DATE: **2022-03-23**	PROJECT NO.: **477**

Figure 6 - CO 0.5 h Maximum Concentration Isopleths

PROJECT TITLE:

Hydrogen Ready Power Project
Dispersion Modeling Multi-Tier Receptor Grid

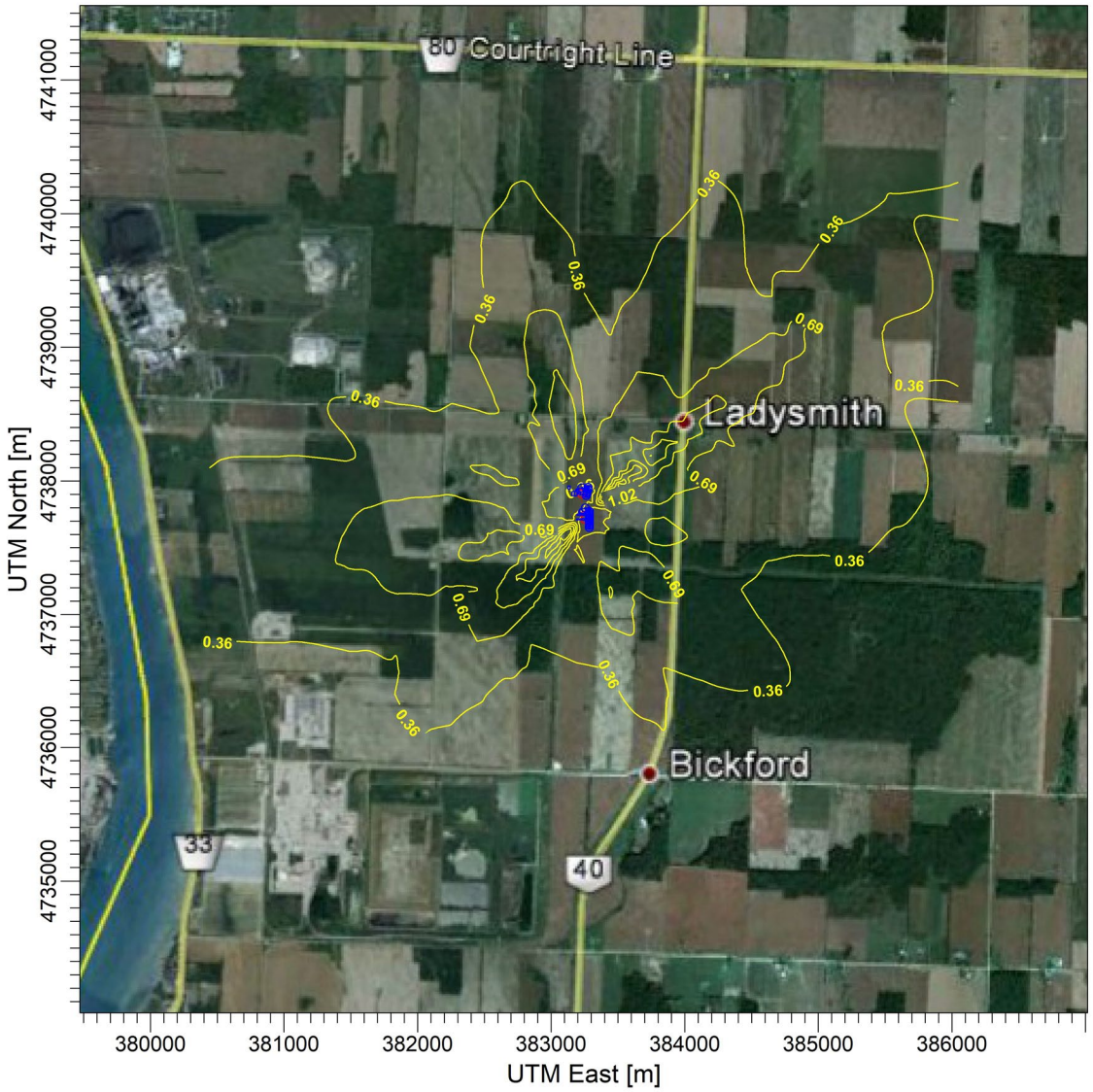


COMMENTS: Operating Scenario Warm Start Followed by Full Load 35% NG / 65% Hydrogen Gas	SOURCES: **2**	COMPANY NAME: **Eastern Power Inc.**	
	RECEPTORS: **1161**	MODELER: **FCI**	
	OUTPUT TYPE: **Concentration**	SCALE: 1:55,000 0 2 km	
	MAX: **162 ug/m^3**	DATE: **2022-03-23**	PROJECT NO.: **477**

Figure 7 - PM 24 h Maximum Concentration Isopleths

PROJECT TITLE:

Hydrogen Ready Power Project
Dispersion Modeling Multi-Tier Receptor Grid

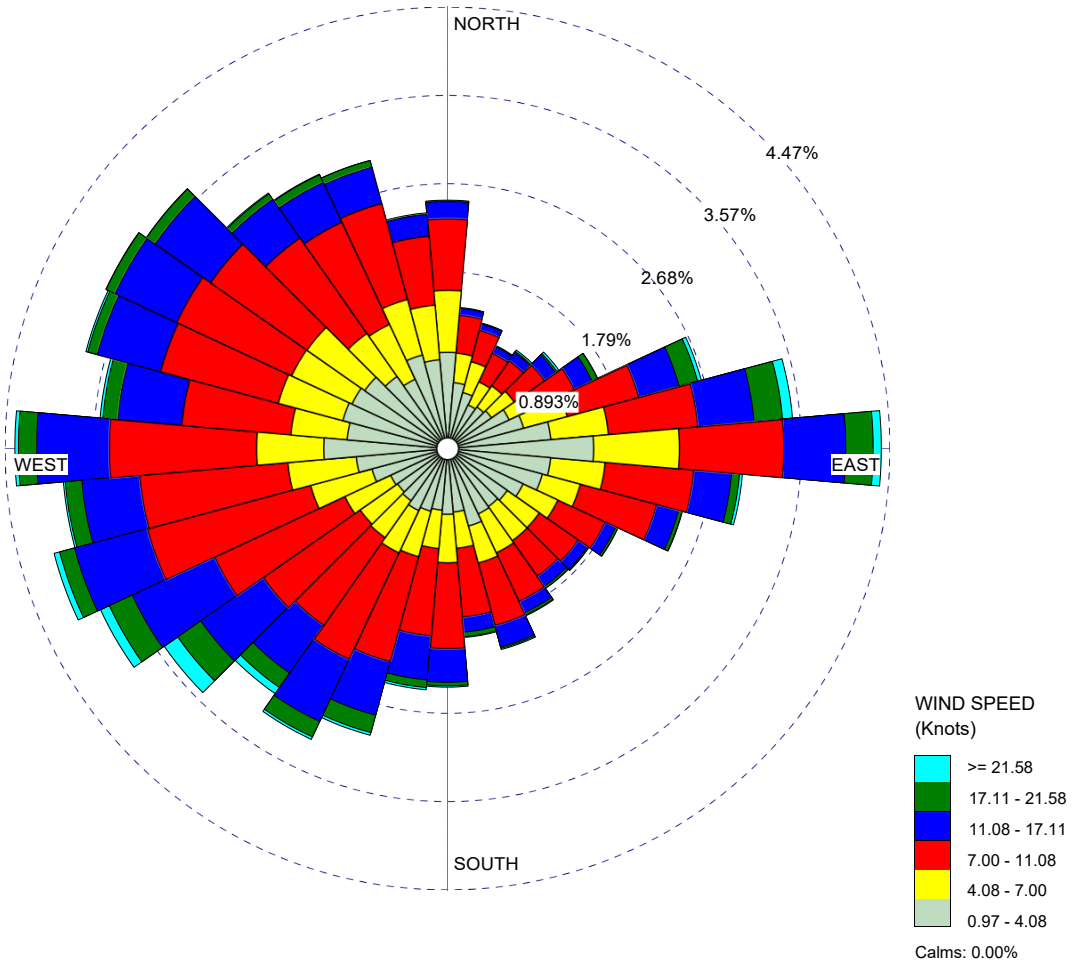


COMMENTS: Operating Scenario Start-up Followed by Full Load 35% NG / 65% Hydrogen Gas	SOURCES: **2**	COMPANY NAME: **Eastern Power Inc.**	
	RECEPTORS: **1161**	MODELER: **FCI**	
	OUTPUT TYPE: **Concentration**	SCALE: 0 1:55,000 2 km	
	MAX: **2.36 ug/m^3**	DATE: **2022-03-23**	PROJECT NO.: **477**

Figure 8 - Wind Rose Plot

WIND ROSE PLOT:
Station #61444 - LONDON, ON

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1996-01-01 - 00:00** **End Date: 2000-12-31 - 23:59**	COMPANY NAME: **Eastern Power Inc.**	
		MODELER: **FCI**	
	CALM WINDS: **0.00%**	TOTAL COUNT: **86054 hrs.**	
	AVG. WIND SPEED: **7.18 Knots**	DATE: **2021-11-01**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

9.6 Receptors of Interest

Tables 17a, 17b,17c and Tables 18a, 18b, 18c compare, for the two scenarios, full load operation and start-up followed by full load operation yielding worst-case results, the individual averaging period contaminant concentration expected from the project at each receptor of interest, against the applicable MECP POI criteria. These tables show that all MECP POI criteria will be met at all receptors of interest.

Tables 19a, 19b, 19c and Tables 20a, 20b, 20c compare, for the two scenarios listed above yielding worst-case results, the one-hour contaminant concentrations expected from the project at each receptor of interest combined with the 90th percentile local air quality data, against all applicable one-hour Ambient Air Quality Criteria. These tables show that all one-hour Ambient Air Quality Criteria will be met at all receptors of interest, in spite of assuming applicable worst-case emission scenarios.

Medium and long-term contaminant concentrations at receptors of interest were also calculated for those contaminants for which there are 8-hour, 24 hour and annual standards as identified in Table 4.

The results of the CO assessment at the receptors of interest are provided in Tables 21a, 21b, 21c and Tables 22a, 22b, 22c, which show that the 8-hour AAQC for CO will be met at all receptors of interest.

The results of the 24-hour assessment of the NO_2, SO_2, PM at each of the receptors of interest are provided in Tables 23a, 23b, 23c and Tables 24a, 24b, 24c, which show that each applicable 24-hour AAQC will be met. These Tables also show that the maximum 24-hour local ambient concentration of PM2.5 is already in excess of the MECP AAQC criteria. Given the small impact on existing maximum 24-hour ambient data (3.3 % maximum addition at a receptor of interest), and the uncertainty which exists around whether natural gas fired gas turbines are net emitters of PM2.5, this small impact is considered acceptable. PM10 was not monitored at the MECP Sarnia air monitoring station. Following the same reasoning for PM2.5, PM10 emissions from the facility will also have a negligible impact on the airshed and is considered acceptable.

The results of the annual PM and SO_2 assessment at the receptors of interest are provided in Tables 25a, 25b, 25c and Tables 26a, 26b, 26c, which show that the annual AAQC for PM and SO_2 will be met at all receptors of interest.

Table 17a - Maximum POI Concentration at the Receptors of Interest 100% Natural Gas (Full Load Operation)

100% Natural Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
R1	Residential - 2 Storey	NO_2	0	21.02	31.88	1 h	400	7.97%
				9.55	3.79	24 h	200	1.90%
		CO		20.35	37.04	0.5 h	6000	0.62%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.86	24 h	120	0.72%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	2.28E-03	24	1000	0.00%
		Toluene		0.051	N/A	N/A	N/A	N/A
		Xylenes		0.0115	4.55E-03	24	730	0.00%
		NO_2	4.5	21.02	31.90	1 h	400	7.98%
				9.55	3.75	24 h	200	1.88%
		CO		20.35	37.07	0.5 h	6000	0.62%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.85	24 h	120	0.71%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	2.25E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	4.50E-03	24	730	0.00%
R2	Residential - 2 Storey	NO_2	0	21.02	23.42	1 h	400	5.86%
				9.55	3.47	24 h	200	1.73%
		CO		20.35	27.21	0.5 h	6000	0.45%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.79	24 h	120	0.66%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	2.08E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	4.16E-03	24	730	0.00%
		NO_2	4.5	21.02	23.54	1 h	400	5.88%

100% Natural Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
				9.55	3.40	24 h	200	1.70%
		CO		20.35	27.35	0.5 h	6000	0.46%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.77	24 h	120	0.64%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	2.04E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	4.08E-03	24	730	0.00%
R3	Residential - 2 Storey	NO_2	0	21.02	24.14	1 h	400	6.04%
				9.55	4.69	24 h	200	2.35%
		CO		20.35	28.05	0.5 h	6000	0.47%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	1.07	24 h	120	0.89%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	2.81E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	5.63E-03	24	730	0.00%
		NO_2	4.5	21.02	24.55	1 h	400	6.14%
				9.55	4.78	24 h	200	2.39%
		CO		20.35	28.52	0.5 h	6000	0.48%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	1.09	24 h	120	0.91%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	2.87E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	5.73E-03	24	730	0.00%
R4	Residential - 2 Storey	NO_2	0	21.02	20.09	1 h	400	5.02%
				9.55	4.26	24 h	200	2.13%
		CO		20.35	23.35	0.5 h	6000	0.39%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%

100% Natural Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
		PM		2.17	0.97	24 h	120	0.81%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	2.55E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	5.11E-03	24	730	0.00%
		NO_2		21.02	20.07	1 h	400	5.02%
				9.55	4.19	24 h	200	2.09%
		CO		20.35	23.32	0.5 h	6000	0.39%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM	4.5	2.17	0.95	24 h	120	0.79%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	2.51E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	5.02E-03	24	730	0.00%
R5	Residential - 2 Storey	NO_2		21.02	26.36	1 h	400	6.59%
				9.55	2.36	24 h	200	1.18%
		CO		20.35	30.62	0.5 h	6000	0.51%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM	0	2.17	0.54	24 h	120	0.45%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	1.42E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	2.84E-03	24	730	0.00%
		NO_2		21.02	26.35	1 h	400	6.59%
				9.55	2.37	24 h	200	1.18%
		CO		20.35	30.62	0.5 h	6000	0.51%
		SO_2		0.00	0.00	1 h	690	0.00%
			4.5	0.00	0.00	24 h	275	0.00%
		PM		2.17	0.54	24 h	120	0.45%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	1.42E-03	24	1000	0.00%

100% Natural Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	2.84E-03	24	730	0.00%
R6	Residential - 2 Storey	NO_2	0	21.02	21.54	1 h	400	5.39%
				9.55	2.57	24 h	200	1.29%
		CO		20.35	25.03	0.5 h	6000	0.42%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.59	24 h	120	0.49%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	1.54E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	3.09E-03	24	730	0.00%
		NO_2	4.5	21.02	21.48	1 h	400	5.37%
				9.55	2.49	24 h	200	1.24%
		CO		20.35	24.96	0.5 h	6000	0.42%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.57	24 h	120	0.47%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	1.49E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	2.99E-03	24	730	0.00%

Table 17b - Maximum POI Concentration at the Receptors of Interest 80% Natural Gas/20% Hydrogen Gas (Full Load Operation)

80% Natural Gas,20% Hydrogen Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
R1	Residential - 2 Storey	NO_2	0	29.92	45.38	1 h	400	11.34%
				13.59	5.40	24 h	200	2.70%
		CO		20.34	37.02	0.5 h	6000	0.62%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.86	24 h	120	0.72%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	1.82E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.00916	3.64E-03	24	730	0.00%
		NO_2	4.5	29.92	45.42	1 h	400	11.35%
				13.59	5.34	24 h	200	2.67%
		CO		20.34	37.05	0.5 h	6000	0.62%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.85	24 h	120	0.71%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	0.00E+00	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.00916	0.00E+00	24	730	0.00%
R2	Residential - 2 Storey	NO_2	0	29.92	33.34	1 h	400	8.34%
				13.59	4.94	24 h	200	2.47%
		CO		20.34	27.20	0.5 h	6000	0.45%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.79	24 h	120	0.66%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	1.66E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.00916	3.33E-03	24	730	0.00%
		NO_2	4.5	29.92	33.51	1 h	400	8.38%

80% Natural Gas,20% Hydrogen Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
				13.59	4.84	24 h	200	2.42%
		CO		20.34	27.34	0.5 h	6000	0.46%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.77	24 h	120	0.64%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	1.63E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.00916	3.26E-03	24	730	0.00%
R3	Residential - 2 Storey	NO_2	0	29.92	34.37	1 h	400	8.59%
				13.59	6.68	24 h	200	3.34%
		CO		20.34	28.04	0.5 h	6000	0.47%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	1.07	24 h	120	0.89%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	2.25E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.00916	4.50E-03	24	730	0.00%
		NO_2	4.5	29.92	34.95	1 h	400	8.74%
				13.59	6.80	24 h	200	3.40%
		CO		20.34	28.51	0.5 h	6000	0.48%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	1.09	24 h	120	0.91%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	2.29E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.00916	4.59E-03	24	730	0.00%
R4	Residential - 2 Storey	NO_2	0	29.92	28.60	1 h	400	7.15%
				13.59	6.06	24 h	200	3.03%
		CO		20.34	23.33	0.5 h	6000	0.39%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%

80% Natural Gas,20% Hydrogen Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
		PM		2.17	0.97	24 h	120	0.81%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	2.04E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.00916	4.08E-03	24	730	0.00%
		NO_2		29.92	28.58	1 h	400	7.14%
				13.59	5.96	24 h	200	2.98%
		CO		20.34	23.31	0.5 h	6000	0.39%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM	4.5	2.17	0.95	24 h	120	0.79%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	2.01E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.00916	4.02E-03	24	730	0.00%
R5	Residential - 2 Storey	NO_2		29.92	37.52	1 h	400	9.38%
				13.59	3.36	24 h	200	1.68%
		CO		20.34	30.61	0.5 h	6000	0.51%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM	0	2.17	0.54	24 h	120	0.45%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	1.13E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.00916	2.27E-03	24	730	0.00%
		NO_2		29.92	37.52	1 h	400	9.38%
				13.59	3.37	24 h	200	1.69%
		CO		20.34	30.60	0.5 h	6000	0.51%
		SO_2		0.00	0.00	1 h	690	0.00%
			4.5	0.00	0.00	24 h	275	0.00%
		PM		2.17	0.54	24 h	120	0.45%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	1.14E-03	24	1000	0.00%

80% Natural Gas,20% Hydrogen Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.00916	2.27E-03	24	730	0.00%
R6	Residential - 2 Storey	NO_2	0	29.92	30.67	1 h	400	7.67%
				13.59	3.66	24 h	200	1.83%
		CO		20.34	25.02	0.5 h	6000	0.42%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.59	24 h	120	0.49%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	1.24E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.00916	2.47E-03	24	730	0.00%
		NO_2	4.5	29.92	30.58	1 h	400	7.64%
				13.59	3.54	24 h	200	1.77%
		CO		20.34	24.94	0.5 h	6000	0.42%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.57	24 h	120	0.47%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	1.19E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.00916	2.39E-03	24	730	0.00%

Table 17c - Maximum POI Concentration at the Receptors of Interest 35% Natural Gas/65% Hydrogen Gas (Full Load Operation)

35% Natural Gas, 65% Hydrogen Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
R1	Residential - 2 Storey	NO_2	0	44.63	67.68	1 h	400	16.92%
				20.27	8.06	24 h	200	4.03%
		CO		34.72	63.19	0.5 h	6000	1.05%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.86	24 h	120	0.72%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	7.97E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.59E-03	24	730	0.00%
		NO_2	4.5	44.63	67.74	1 h	400	16.94%
				20.27	7.97	24 h	200	3.99%
		CO		34.72	63.25	0.5 h	6000	1.05%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.85	24 h	120	0.71%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	7.88E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.58E-03	24	730	0.00%
R2	Residential - 2 Storey	NO_2	0	44.63	49.73	1 h	400	12.43%
				20.27	7.37	24 h	200	3.68%
		CO		34.72	46.43	0.5 h	6000	0.77%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.79	24 h	120	0.66%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	7.28E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.46E-03	24	730	0.00%
		NO_2	4.5	44.63	49.98	1 h	400	12.50%

35% Natural Gas, 65% Hydrogen Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
				20.27	7.21	24 h	200	3.61%
		CO		34.72	46.66	0.5 h	6000	0.78%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.77	24 h	120	0.64%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	7.13E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.43E-03	24	730	0.00%
R3	Residential - 2 Storey	NO_2	0	44.63	51.27	1 h	400	12.82%
				20.27	9.96	24 h	200	4.98%
		CO		34.72	47.87	0.5 h	6000	0.80%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	1.07	24 h	120	0.89%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	9.85E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.97E-03	24	730	0.00%
		NO_2	4.5	44.63	52.13	1 h	400	13.03%
				20.27	10.15	24 h	200	5.07%
		CO		34.72	48.67	0.5 h	6000	0.81%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	1.09	24 h	120	0.91%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	1.00E-03	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	2.01E-03	24	730	0.00%
R4	Residential - 2 Storey	NO_2	0	44.63	42.67	1 h	400	10.67%
				20.27	9.04	24 h	200	4.52%
		CO		34.72	39.83	0.5 h	6000	0.66%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%

35% Natural Gas, 65% Hydrogen Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
		PM		2.17	0.97	24 h	120	0.81%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	8.94E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.08E-03	24	730	0.00%
		NO_2		44.63	42.62	1 h	400	10.66%
				20.27	8.89	24 h	200	4.44%
		CO		34.72	39.79	0.5 h	6000	0.66%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM	4.5	2.17	0.95	24 h	120	0.79%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	8.79E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.76E-03	24	730	0.00%
R5	Residential - 2 Storey	NO_2		44.63	55.96	1 h	400	13.99%
				20.27	5.02	24 h	200	2.51%
		CO		34.72	52.25	0.5 h	6000	0.87%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM	0	2.17	0.54	24 h	120	0.45%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	4.96E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	9.93E-04	24	730	0.00%
		NO_2		44.63	55.96	1 h	400	13.99%
				20.27	5.03	24 h	200	2.52%
		CO		34.72	52.24	0.5 h	6000	0.87%
		SO_2		0.00	0.00	1 h	690	0.00%
			4.5	0.00	0.00	24 h	275	0.00%
		PM		2.17	0.54	24 h	120	0.45%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	4.98E-04	24	1000	0.00%

35% Natural Gas, 65% Hydrogen Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	9.95E-04	24	730	0.00%
R6	Residential - 2 Storey	NO_2	0	44.63	45.74	1 h	400	11.44%
				20.27	5.46	24 h	200	2.73%
		CO		34.72	42.71	0.5 h	6000	0.71%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.59	24 h	120	0.49%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	5.40E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.08E-03	24	730	0.00%
		NO_2	4.5	44.63	45.61	1 h	400	11.40%
				20.27	5.28	24 h	200	2.64%
		CO		34.72	42.58	0.5 h	6000	0.71%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.17	0.57	24 h	120	0.47%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	5.22E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.04E-03	24	730	0.00%

Table 18a - Maximum POI Concentration at the Receptors of Interest 100% Natural Gas (Start-up followed by Full Load Operation)

100% Natural Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
R1	Residential - 2 Storey	NO_2	0	24.25	36.78	1 h	400	9.19%
				11.01	4.38	24 h	200	2.19%
		CO		38.36	69.82	0.5 h	6000	1.16%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.85	24 h	120	0.71%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	2.28E-03	24	1000	0.00%
		Toluene		0.051	N/A	N/A	N/A	N/A
		Xylenes		0.0115	4.55E-03	24	730	0.00%
		NO_2	4.5	24.25	36.81	1 h	400	9.20%
				11.01	4.33	24 h	200	2.17%
		CO		38.36	69.88	0.5 h	6000	1.16%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.84	24 h	120	0.70%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	2.25E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	4.50E-03	24	730	0.00%
R2	Residential - 2 Storey	NO_2	0	24.25	27.02	1 h	400	6.76%
				11.01	4.00	24 h	200	2.00%
		CO		38.36	51.30	0.5 h	6000	0.86%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.77	24 h	120	0.65%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	2.08E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	4.16E-03	24	730	0.00%

100% Natural Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
		NO_2	4.5	24.25	27.16	1 h	400	6.79%
				11.01	3.92	24 h	200	1.96%
		CO		38.36	51.56	0.5 h	6000	0.86%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.76	24 h	120	0.63%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	2.04E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	4.08E-03	24	730	0.00%
R3	Residential - 2 Storey	NO_2	0	24.25	27.86	1 h	400	6.96%
				11.01	5.41	24 h	200	2.71%
		CO		38.36	52.88	0.5 h	6000	0.88%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	1.05	24 h	120	0.87%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	2.81E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	5.63E-03	24	730	0.00%
		NO_2	4.5	24.25	28.32	1 h	400	7.08%
				11.01	5.51	24 h	200	2.76%
		CO		38.36	53.77	0.5 h	6000	0.90%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	1.07	24 h	120	0.89%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	2.87E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	5.73E-03	24	730	0.00%
R4	Residential - 2 Storey	NO_2	0	24.25	23.18	1 h	400	5.80%
				11.01	4.91	24 h	200	2.46%
		CO		38.36	44.01	0.5 h	6000	0.73%

100% Natural Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.95	24 h	120	0.79%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	2.55E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	5.11E-03	24	730	0.00%
		NO_2	4.5	24.25	23.16	1 h	400	5.79%
				11.01	4.83	24 h	200	2.42%
		CO		38.36	43.97	0.5 h	6000	0.73%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.94	24 h	120	0.78%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	2.51E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	5.02E-03	24	730	0.00%
R5	Residential - 2 Storey	NO_2	0	24.25	30.41	1 h	400	7.60%
				11.01	2.73	24 h	200	1.36%
		CO		38.36	57.73	0.5 h	6000	0.96%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.53	24 h	120	0.44%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	1.42E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	2.84E-03	24	730	0.00%
		NO_2	4.5	24.25	30.41	1 h	400	7.60%
				11.01	2.73	24 h	200	1.37%
		CO		38.36	57.72	0.5 h	6000	0.96%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.53	24 h	120	0.44%

100% Natural Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	1.42E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	2.84E-03	24	730	0.00%
R6	Residential - 2 Storey	NO_2	0	24.25	24.86	1 h	400	6.21%
				11.01	2.97	24 h	200	1.48%
		CO		38.36	47.19	0.5 h	6000	0.79%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.57	24 h	120	0.48%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	1.54E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	3.09E-03	24	730	0.00%
		NO_2	4.5	24.25	24.78	1 h	400	6.20%
				11.01	2.87	24 h	200	1.44%
		CO		38.36	47.04	0.5 h	6000	0.78%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.56	24 h	120	0.46%
		Benzene		0.00215	1.07E-08	Annual	0.45	0.00%
		1,3 Butadiene		0.0000770	3.85E-10	Annual	2	0.00%
		Ethyl Benzene		0.00573	1.49E-03	24	1000	0.00%
		Toluene		0.0512	N/A	N/A	N/A	N/A
		Xylenes		0.0115	2.99E-03	24	730	0.00%

Table 18b - Maximum POI Concentration at the Receptors of Interest 80% Natural Gas/20% Hydrogen Gas (Start-up followed by Full Load Operation)

80% Natural Gas,20% Hydrogen Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
R1	Residential - 2 Storey	NO_2	0	31.17	47.27	1 h	400	11.82%
				11.01	4.38	24 h	200	2.19%
		CO		19.18	34.90	0.5 h	6000	0.58%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.85	24 h	120	0.71%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.00006	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	1.82E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.00916	3.64E-03	24	730	0.00%
		NO_2	4.5	31.17	47.31	1 h	400	11.83%
				11.01	4.33	24 h	200	2.17%
		CO		19.18	34.93	0.5 h	6000	0.58%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.84	24 h	120	0.70%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	0.00E+00	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.0092	0.00E+00	24	730	0.00%
R2	Residential - 2 Storey	NO_2	0	31.17	34.74	1 h	400	8.68%
				11.01	4.00	24 h	200	2.00%
		CO		19.18	25.64	0.5 h	6000	0.43%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.77	24 h	120	0.65%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	1.66E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.0092	3.33E-03	24	730	0.00%
		NO_2	4.5	31.17	34.91	1 h	400	8.73%
				11.01	3.92	24 h	200	1.96%

80% Natural Gas,20% Hydrogen Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
		CO		19.18	25.77	0.5 h	6000	0.43%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.76	24 h	120	0.63%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	1.63E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.0092	3.26E-03	24	730	0.00%
R3	Residential - 2 Storey	NO_2	0	31.17	35.81	1 h	400	8.95%
				11.01	5.41	24 h	200	2.71%
		CO		19.18	26.44	0.5 h	6000	0.44%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	1.05	24 h	120	0.87%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	2.25E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.0092	4.50E-03	24	730	0.00%
		NO_2	4.5	31.17	36.41	1 h	400	9.10%
				11.01	5.51	24 h	200	2.76%
		CO		19.18	26.88	0.5 h	6000	0.45%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	1.07	24 h	120	0.89%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	2.29E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.0092	4.59E-03	24	730	0.00%
R4	Residential - 2 Storey	NO_2	0	31.17	29.80	1 h	400	7.45%
				11.01	4.91	24 h	200	2.46%
		CO		19.18	22.00	0.5 h	6000	0.37%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.95	24 h	120	0.79%

80% Natural Gas,20% Hydrogen Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	2.04E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.0092	4.08E-03	24	730	0.00%
		NO_2		31.17	29.77	1 h	400	7.44%
				11.01	4.83	24 h	200	2.42%
		CO		19.18	21.98	0.5 h	6000	0.37%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM	4.5	2.13	0.94	24 h	120	0.78%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	2.01E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.0092	4.02E-03	24	730	0.00%
R5	Residential - 2 Storey	NO_2		31.17	39.09	1 h	400	9.77%
				11.01	2.73	24 h	200	1.36%
		CO		19.18	28.86	0.5 h	6000	0.48%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM	0	2.13	0.53	24 h	120	0.44%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	1.13E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.0092	2.27E-03	24	730	0.00%
		NO_2		31.17	39.08	1 h	400	9.77%
				11.01	2.73	24 h	200	1.37%
		CO		19.18	28.85	0.5 h	6000	0.48%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM	4.5	2.13	0.53	24 h	120	0.44%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	1.14E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A

80% Natural Gas,20% Hydrogen Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
		Xylenes		0.0092	2.27E-03	24	730	0.00%
R6	Residential - 2 Storey	NO_2	0	31.17	31.95	1 h	400	7.99%
				11.01	2.97	24 h	200	1.48%
		CO		19.18	23.59	0.5 h	6000	0.39%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.57	24 h	120	0.48%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	1.24E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.0092	2.47E-03	24	730	0.00%
		NO_2	4.5	31.17	31.85	1 h	400	7.96%
				11.01	2.87	24 h	200	1.44%
		CO		19.18	23.52	0.5 h	6000	0.39%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.56	24 h	120	0.46%
		Benzene		0.00172	8.59E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000616	3.08E-10	Annual	2	0.00%
		Ethyl Benzene		0.00458	1.19E-03	24	1000	0.00%
		Toluene		0.0410	N/A	N/A	N/A	N/A
		Xylenes		0.0092	2.39E-03	24	730	0.00%

Table 18c - Maximum POI Concentration at the Receptors of Interest 35% Natural Gas/65% Hydrogen Gas (Start-up followed by Full Load Operation)

35% Natural Gas, 65% Hydrogen Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
R1	Residential - 2 Storey	NO_2	0	44.51	67.51	1 h	400	16.88%
				20.22	8.04	24 h	200	4.02%
		CO		51.17	93.12	0.5 h	6000	1.55%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.85	24 h	120	0.71%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	7.97E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.59E-03	24	730	0.00%
		NO_2	4.5	44.51	67.57	1 h	400	16.89%
				20.22	7.95	24 h	200	3.98%
		CO		51.17	93.20	0.5 h	6000	1.55%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.84	24 h	120	0.70%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	7.88E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.58E-03	24	730	0.00%
R2	Residential - 2 Storey	NO_2	0	44.51	49.60	1 h	400	12.40%
				20.22	7.35	24 h	200	3.67%
		CO		51.17	68.42	0.5 h	6000	1.14%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.77	24 h	120	0.65%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	7.28E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.46E-03	24	730	0.00%
		NO_2	4.5	44.51	49.85	1 h	400	12.46%
				20.22	7.20	24 h	200	3.60%

35% Natural Gas, 65% Hydrogen Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
		CO		51.17	68.77	0.5 h	6000	1.15%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.76	24 h	120	0.63%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	7.13E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.43E-03	24	730	0.00%
R3	Residential - 2 Storey	NO_2	0	44.51	51.13	1 h	400	12.78%
				20.22	9.93	24 h	200	4.97%
		CO		51.17	70.54	0.5 h	6000	1.18%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	1.05	24 h	120	0.87%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	9.85E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.97E-03	24	730	0.00%
		NO_2	4.5	44.51	51.99	1 h	400	13.00%
				20.22	10.12	24 h	200	5.06%
		CO		51.17	71.72	0.5 h	6000	1.20%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	1.07	24 h	120	0.89%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	1.00E-03	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	2.01E-03	24	730	0.00%
R4	Residential - 2 Storey	NO_2	0	44.51	42.55	1 h	400	10.64%
				20.22	9.01	24 h	200	4.51%
		CO		51.17	58.70	0.5 h	6000	0.98%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.95	24 h	120	0.79%

35% Natural Gas, 65% Hydrogen Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	8.94E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.08E-03	24	730	0.00%
		NO_2		44.51	42.51	1 h	400	10.63%
				20.22	8.87	24 h	200	4.43%
		CO		51.17	58.64	0.5 h	6000	0.98%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM	4.5	2.13	0.94	24 h	120	0.78%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	8.79E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.76E-03	24	730	0.00%
R5	Residential - 2 Storey	NO_2		44.51	55.82	1 h	400	13.95%
				20.22	5.01	24 h	200	2.50%
		CO		51.17	77.00	0.5 h	6000	1.28%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM	0	2.13	0.53	24 h	120	0.44%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	4.96E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	9.93E-04	24	730	0.00%
		NO_2		44.51	55.81	1 h	400	13.95%
				20.22	5.02	24 h	200	2.51%
		CO		51.17	76.99	0.5 h	6000	1.28%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM	4.5	2.13	0.53	24 h	120	0.44%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	4.98E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A

35% Natural Gas, 65% Hydrogen Gas								
Receptor	Description	Contaminant	Flag Pole Elevation (m)	Total Facility Emission Rate (g/s)	Max. POI Concentration (ug/m^3)	Averaging Period	MECP POI Limit (ug/m^3)	Percentage of MECP POI Limit
		Xylenes		0.00401	9.95E-04	24	730	0.00%
R6	Residential - 2 Storey	NO_2	0	44.51	45.62	1 h	400	11.41%
				20.22	5.45	24 h	200	2.73%
		CO		51.17	62.94	0.5 h	6000	1.05%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.57	24 h	120	0.48%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	5.40E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.08E-03	24	730	0.00%
		NO_2	4.5	44.51	45.49	1 h	400	11.37%
				20.22	5.27	24 h	200	2.63%
		CO		51.17	62.75	0.5 h	6000	1.05%
		SO_2		0.00	0.00	1 h	690	0.00%
				0.00	0.00	24 h	275	0.00%
		PM		2.13	0.56	24 h	120	0.46%
		Benzene		0.000752	3.76E-09	Annual	0.45	0.00%
		1,3 Butadiene		0.0000269	1.35E-10	Annual	2	0.00%
		Ethyl Benzene		0.00200	5.22E-04	24	1000	0.00%
		Toluene		0.0179	N/A	N/A	N/A	N/A
		Xylenes		0.00401	1.04E-03	24	730	0.00%

Table 19a - 1 h AAQC and CAAQS Concentration at the Receptors of Interest 100% Natural Gas (Full Load Operation)

100% Natural Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	1 h AAQC (ug/m^3)	2025 1 h CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 1 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 1 - Full Load Operation	R1	NO_2	0	400	82	21.02	31.88	31.04	62.92	33.86	65.73
		CO		36200	N/A	20.35	30.86	692.96	723.82	771.29	802.15
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.90	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	21.02	31.90	31.04	62.95	33.86	65.76
		CO		36200	N/A	20.35	30.89	692.96	723.85	771.29	802.18
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.88	N/A	N/A	N/A	N/A
	R2	NO_2	0	400	82	21.02	23.42	31.04	54.47	33.86	57.28
		CO		36200	N/A	20.35	22.68	692.96	715.63	771.29	793.97
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.74	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	21.02	23.54	31.04	54.58	33.86	57.39
		CO		36200	N/A	20.35	22.79	692.96	715.75	771.29	794.08
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.70	N/A	N/A	N/A	N/A
	R3	NO_2	0	400	82	21.02	24.14	31.04	55.19	33.86	58.00
		CO		36200	N/A	20.35	23.38	692.96	716.33	771.29	794.67
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	2.35	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	21.02	24.55	31.04	55.59	33.86	58.40
		CO		36200	N/A	20.35	23.77	692.96	716.73	771.29	795.06
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	2.40	N/A	N/A	N/A	N/A
	R4	NO_2	0	400	82	21.02	20.09	31.04	51.14	33.86	53.95
		CO		36200	N/A	20.35	19.45	692.96	712.41	771.29	790.75
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	2.13	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	21.02	20.07	31.04	51.12	33.86	53.93
		CO		36200	N/A	20.35	19.44	692.96	712.39	771.29	790.73
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	2.10	N/A	N/A	N/A	N/A
	R5	NO_2	0	400	82	21.02	26.36	31.04	57.40	33.86	60.21
		CO		36200	N/A	20.35	25.52	692.96	718.48	771.29	796.81

100% Natural Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	1 h AAQC (ug/m^3)	2025 1 h CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 1 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.18	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	21.02	26.35	31.04	57.40	33.86	60.21
		CO		36200	N/A	20.35	25.52	692.96	718.47	771.29	796.81
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.19	N/A	N/A	N/A	N/A
	R6	NO_2	0	400	82	21.02	21.54	31.04	52.59	33.86	55.40
		CO		36200	N/A	20.35	20.86	692.96	713.82	771.29	792.15
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.29	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	21.02	21.48	31.04	52.52	33.86	55.33
		CO		36200	N/A	20.35	20.80	692.96	713.75	771.29	792.09
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.25	N/A	N/A	N/A	N/A

Table 19b - 1 h AAQC and CAAQS Concentration at the Receptors of Interest 80% Natural Gas/20% Hydrogen Gas (Full Load Operation)

80% Natural Gas, 20% Hydrogen Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	1 h AAQC (ug/m^3)	2025 1 h CAAQS (ug/m3)	Total Facility Emission Rate (g/s)	Max. 1 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 1 - Full Load Operation	R1	NO_2	0	400	82	29.92	45.38	31.04	76.42	33.86	79.23
		CO		36200	N/A	20.34	30.85	692.96	723.80	771.29	802.14
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.90	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	29.92	45.42	31.04	76.46	33.86	79.27
		CO		36200	N/A	20.34	30.88	692.96	723.83	771.29	802.17
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.88	N/A	N/A	N/A	N/A
	R2	NO_2	0	400	82	29.92	33.34	31.04	64.39	33.86	67.20
		CO		36200	N/A	20.34	22.67	692.96	715.62	771.29	793.96
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.74	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	29.92	33.51	31.04	64.55	33.86	67.37
		CO		36200	N/A	20.34	22.78	692.96	715.74	771.29	794.07
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.70	N/A	N/A	N/A	N/A
	R3	NO_2	0	400	82	29.92	34.37	31.04	65.42	33.86	68.23
		CO		36200	N/A	20.34	23.37	692.96	716.32	771.29	794.66
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	2.35	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	29.92	34.95	31.04	65.99	33.86	68.80
		CO		36200	N/A	20.34	23.76	692.96	716.71	771.29	795.05
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	2.40	N/A	N/A	N/A	N/A
	R4	NO_2	0	400	82	29.92	28.60	31.04	59.65	33.86	62.46
		CO		36200	N/A	20.34	19.45	692.96	712.40	771.29	790.74
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	2.13	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	29.92	28.58	31.04	59.62	33.86	62.43
		CO		36200	N/A	20.34	19.43	692.96	712.38	771.29	790.72
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	2.10	N/A	N/A	N/A	N/A
	R5	NO_2	0	400	82	29.92	37.52	31.04	68.56	33.86	71.38
		CO		36200	N/A	20.34	25.51	692.96	718.46	771.29	796.80

80% Natural Gas, 20% Hydrogen Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	1 h AAQC (ug/m^3)	2025 1 h CAAQS (ug/m3)	Total Facility Emission Rate (g/s)	Max. 1 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.18	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	29.92	37.52	31.04	68.56	33.86	71.37
		CO		36200	N/A	20.34	25.50	692.96	718.46	771.29	796.79
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.19	N/A	N/A	N/A	N/A
	R6	NO_2	0	400	82	29.92	30.67	31.04	61.71	33.86	64.52
		CO		36200	N/A	20.34	20.85	692.96	713.81	771.29	792.14
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.29	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	29.92	30.58	31.04	61.62	33.86	64.43
		CO		36200	N/A	20.34	20.79	692.96	713.74	771.29	792.08
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.25	N/A	N/A	N/A	N/A

Table 19c - 1 h AAQC and CAAQS Concentration at the Receptors of Interest 35% Natural Gas/65% Hydrogen Gas (Full Load Operation)

35% Natural Gas, 65% Hydrogen Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	1 h AAQC (ug/m^3)	2025 1 h CAAQS (ug/m3)	Total Facility Emission Rate (g/s)	Max. 1 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 1 - Full Load Operation	R1	NO_2	0	400	82	44.63	67.68	31.04	98.73	33.86	101.54
		CO		36200	N/A	34.72	52.66	692.96	745.62	771.29	823.95
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.90	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	44.63	67.74	31.04	98.79	33.86	101.60
		CO		36200	N/A	34.72	52.71	692.96	745.66	771.29	824.00
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.88	N/A	N/A	N/A	N/A
	R2	NO_2	0	400	82	44.63	49.73	31.04	80.78	33.86	83.59
		CO		36200	N/A	34.72	38.69	692.96	731.65	771.29	809.98
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.74	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	44.63	49.98	31.04	81.03	33.86	83.84
		CO		36200	N/A	34.72	38.89	692.96	731.84	771.29	810.18
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.70	N/A	N/A	N/A	N/A
	R3	NO_2	0	400	82	44.63	51.27	31.04	82.31	33.86	85.12
		CO		36200	N/A	34.72	39.89	692.96	732.85	771.29	811.18
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	2.35	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	44.63	52.13	31.04	83.17	33.86	85.98
		CO		36200	N/A	34.72	40.55	692.96	733.51	771.29	811.85
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	2.40	N/A	N/A	N/A	N/A
	R4	NO_2	0	400	82	44.63	42.67	31.04	73.71	33.86	76.52
		CO		36200	N/A	34.72	33.19	692.96	726.15	771.29	804.49
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	2.13	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	44.63	42.62	31.04	73.67	33.86	76.48
		CO		36200	N/A	34.72	33.16	692.96	726.12	771.29	804.45
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	2.10	N/A	N/A	N/A	N/A
	R5	NO_2	0	400	82	44.63	55.96	31.04	87.01	33.86	89.82
		CO		36200	N/A	34.72	43.54	692.96	736.50	771.29	814.83

35% Natural Gas, 65% Hydrogen Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	1 h AAQC (ug/m^3)	2025 1 h CAAQS (ug/m3)	Total Facility Emission Rate (g/s)	Max. 1 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.18	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	44.63	55.96	31.04	87.00	33.86	89.81
		CO		36200	N/A	34.72	43.54	692.96	736.49	771.29	814.83
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.19	N/A	N/A	N/A	N/A
	R6	NO_2	0	400	82	44.63	45.74	31.04	76.79	33.86	79.60
		CO		36200	N/A	34.72	35.59	692.96	728.55	771.29	806.88
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.29	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	44.63	45.61	31.04	76.65	33.86	79.46
		CO		36200	N/A	34.72	35.48	692.96	728.44	771.29	806.77
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.78	1.25	N/A	N/A	N/A	N/A

Table 20a - 1 h AAQC and CAAQS Concentration at the Receptors of Interest 100% Natural Gas (Start-up followed by Full Load Operation)

100% Natural Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	1 h AAQC (ug/m^3)	2025 1 h CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 1 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 2 - Start up Followed by Full Load Operaion	R1	NO_2	0	400	82	24.25	36.78	31.04	67.82	33.86	70.63
		CO		36200	N/A	38.36	58.18	692.96	751.14	771.29	829.47
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.87	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	24.25	36.81	31.04	67.86	33.86	70.67
		CO		36200	N/A	38.36	58.23	692.96	751.19	771.29	829.52
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.85	N/A	N/A	N/A	N/A
	R2	NO_2	0	400	82	24.25	27.02	31.04	58.07	33.86	60.88
		CO		36200	N/A	38.36	42.75	692.96	735.71	771.29	814.04
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.71	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	24.25	27.16	31.04	58.20	33.86	61.02
		CO		36200	N/A	38.36	42.96	692.96	735.92	771.29	814.25
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.67	N/A	N/A	N/A	N/A
	R3	NO_2	0	400	82	24.25	27.86	31.04	58.90	33.86	61.72
		CO		36200	N/A	38.36	44.07	692.96	737.03	771.29	815.36
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	2.31	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	24.25	28.32	31.04	59.37	33.86	62.18
		CO		36200	N/A	38.36	44.81	692.96	737.76	771.29	816.10
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	2.35	N/A	N/A	N/A	N/A
	R4	NO_2	0	400	82	24.25	23.18	31.04	54.23	33.86	57.04
		CO		36200	N/A	38.36	36.67	692.96	729.63	771.29	807.97
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	2.09	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	24.25	23.16	31.04	54.21	33.86	57.02
		CO		36200	N/A	38.36	36.64	692.96	729.60	771.29	807.93
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	2.06	N/A	N/A	N/A	N/A
	R5	NO_2	0	400	82	24.25	30.41	31.04	61.46	33.86	64.27
		CO		36200	N/A	38.36	48.11	692.96	741.06	771.29	819.40
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.16	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	24.25	30.41	31.04	61.45	33.86	64.26

100% Natural Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	1 h AAQC (ug/m^3)	2025 1 h CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 1 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		CO		36200	N/A	38.36	48.10	692.96	741.06	771.29	819.39
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.17	N/A	N/A	N/A	N/A
	R6	NO_2	0	400	82	24.25	24.86	31.04	55.90	33.86	58.71
		CO		36200	N/A	38.36	39.32	692.96	732.28	771.29	810.61
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.27	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	24.25	24.78	31.04	55.83	33.86	58.64
		CO		36200	N/A	38.36	39.20	692.96	732.16	771.29	810.49
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.22	N/A	N/A	N/A	N/A

Table 20b - 1 h AAQC and CAAQS Concentration at the Receptors of Interest 80% Natural Gas/ 20% Hydrogen Gas (Start-up followed by Full Load Operation)

80% Natural Gas, 20% Hydrogen Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	1 h AAQC (ug/m^3)	2025 1 h CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 1 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 2 - Start up Followed by Full Load Operaion	R1	NO_2	0	400	82	31.17	47.27	31.04	78.32	33.86	81.13
		CO		36200	N/A	19.18	29.08	692.96	722.04	771.29	800.37
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.87	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	31.17	47.31	31.04	78.36	33.86	81.17
		CO		36200	N/A	19.18	29.11	692.96	722.07	771.29	800.40
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.85	N/A	N/A	N/A	N/A
	R2	NO_2	0	400	82	31.17	34.74	31.04	65.78	33.86	68.59
		CO		36200	N/A	19.18	21.37	692.96	714.33	771.29	792.66
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.71	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	31.17	34.91	31.04	65.95	33.86	68.76
		CO		36200	N/A	19.18	21.48	692.96	714.43	771.29	792.77
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.67	N/A	N/A	N/A	N/A
	R3	NO_2	0	400	82	31.17	35.81	31.04	66.85	33.86	69.66
		CO		36200	N/A	19.18	22.03	692.96	714.99	771.29	793.32
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	2.31	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	31.17	36.41	31.04	67.45	33.86	70.26
		CO		36200	N/A	19.18	22.40	692.96	715.36	771.29	793.69
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	2.35	N/A	N/A	N/A	N/A
	R4	NO_2	0	400	82	31.17	29.80	31.04	60.84	33.86	63.65
		CO		36200	N/A	19.18	18.33	692.96	711.29	771.29	789.62
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	2.09	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	31.17	29.77	31.04	60.81	33.86	63.63
		CO		36200	N/A	19.18	18.32	692.96	711.27	771.29	789.61
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	2.06	N/A	N/A	N/A	N/A
	R5	NO_2	0	400	82	31.17	39.09	31.04	70.13	33.86	72.94
		CO		36200	N/A	19.18	24.05	692.96	717.00	771.29	795.34
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.16	N/A	N/A	N/A	N/A

80% Natural Gas, 20% Hydrogen Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	1 h AAQC (ug/m^3)	2025 1 h CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 1 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		NO_2	4.5	400	82	31.17	39.08	31.04	70.13	33.86	72.94
		CO		36200	N/A	19.18	24.04	692.96	717.00	771.29	795.34
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.17	N/A	N/A	N/A	N/A
	R6	NO_2	0	400	82	31.17	31.95	31.04	62.99	33.86	65.81
		CO		36200	N/A	19.18	19.66	692.96	712.61	771.29	790.95
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.27	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	31.17	31.85	31.04	62.90	33.86	65.71
		CO		36200	N/A	19.18	19.60	692.96	712.55	771.29	790.89
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.22	N/A	N/A	N/A	N/A

Table 20c - 1 h AAQC and CAAQS Concentration at the Receptors of Interest 35% Natural Gas/ 65% Hydrogen Gas (Start-up followed by Full Load Operation)

35% Natural Gas, 65% Hydrogen Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	1 h AAQC (ug/m^3)	2025 1 h CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 1 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 2 - Start up Followed by Full Load Operaion	R1	NO_2	0	400	82	44.51	67.51	31.04	98.55	33.86	101.36
		CO		36200	N/A	51.17	77.60	692.96	770.56	771.29	848.89
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.87	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	44.51	67.57	31.04	98.61	33.86	101.42
		CO		36200	N/A	51.17	77.67	692.96	770.63	771.29	848.96
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.85	N/A	N/A	N/A	N/A
	R2	NO_2	0	400	82	44.51	49.60	31.04	80.65	33.86	83.46
		CO		36200	N/A	51.17	57.02	692.96	749.98	771.29	828.31
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.71	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	44.51	49.85	31.04	80.89	33.86	83.71
		CO		36200	N/A	51.17	57.31	692.96	750.26	771.29	828.60
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.67	N/A	N/A	N/A	N/A
	R3	NO_2	0	400	82	44.51	51.13	31.04	82.18	33.86	84.99
		CO		36200	N/A	51.17	58.78	692.96	751.74	771.29	830.07
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	2.31	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	44.51	51.99	31.04	83.03	33.86	85.84
		CO		36200	N/A	51.17	59.76	692.96	752.72	771.29	831.05
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	2.35	N/A	N/A	N/A	N/A
	R4	NO_2	0	400	82	44.51	42.55	31.04	73.60	33.86	76.41
		CO		36200	N/A	51.17	48.92	692.96	741.87	771.29	820.21
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	2.09	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	44.51	42.51	31.04	73.56	33.86	76.37
		CO		36200	N/A	51.17	48.87	692.96	741.83	771.29	820.16
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	2.06	N/A	N/A	N/A	N/A
	R5	NO_2	0	400	82	44.51	55.82	31.04	86.86	33.86	89.67
		CO		36200	N/A	51.17	64.16	692.96	757.12	771.29	835.46
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.16	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	44.51	55.81	31.04	86.85	33.86	89.67

35% Natural Gas, 65% Hydrogen Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	1 h AAQC (ug/m^3)	2025 1 h CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 1 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		CO		36200	N/A	51.17	64.16	692.96	757.11	771.29	835.45
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.17	N/A	N/A	N/A	N/A
	R6	NO_2	0	400	82	44.51	45.62	31.04	76.67	33.86	79.48
		CO		36200	N/A	51.17	52.45	692.96	745.40	771.29	823.74
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.27	N/A	N/A	N/A	N/A
		NO_2	4.5	400	82	44.51	45.49	31.04	76.53	33.86	79.34
		CO		36200	N/A	51.17	52.29	692.96	745.25	771.29	823.58
		SO_2		106	N/A	0.00	0.00	10.72	10.72	11.73	11.73
		PM		N/A	N/A	4.70	1.22	N/A	N/A	N/A	N/A

Table 21a - 8 h AAQC Concentration at the Receptors of Interest 100% Natural Gas (Full Load Operation)

100% Natural Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	8 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 8 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 1 - Full Load Operation	R1	CO	0	15700	27.73	23.49	1530.53	1554.02	1649.54	1673.03
		CO	4.5	15700	27.73	23.51	1530.53	1554.04	1649.54	1673.05
	R2	CO	0	15700	27.73	17.26	1530.53	1547.79	1649.54	1666.80
		CO	4.5	15700	27.73	17.35	1530.53	1547.88	1649.54	1666.89
	R3	CO	0	15700	27.73	17.79	1530.53	1548.32	1649.54	1667.33
		CO	4.5	15700	27.73	18.09	1530.53	1548.62	1649.54	1667.63
	R4	CO	0	15700	27.73	14.81	1530.53	1545.34	1649.54	1664.35
		CO	4.5	15700	27.73	14.79	1530.53	1545.32	1649.54	1664.33
	R5	CO	0	15700	27.73	19.42	1530.53	1549.95	1649.54	1668.96
		CO	4.5	15700	27.73	19.42	1530.53	1549.95	1649.54	1668.96
	R6	CO	0	15700	27.73	15.88	1530.53	1546.41	1649.54	1665.42
		CO	4.5	15700	27.73	15.83	1530.53	1546.36	1649.54	1665.37

Table 21b - 8 h AAQC Concentration at the Receptors of Interest 80% Natural Gas/20% Hydrogen Gas (Full Load Operation)

80% Natural Gas, 20% Hydrogen Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	8 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 8 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 1 - Full Load Operation	R1	CO	0	15700	27.71	23.48	1530.53	1554.01	1649.54	1673.02
		CO	4.5	15700	27.71	23.50	1530.53	1554.03	1649.54	1673.04
	R2	CO	0	15700	27.71	17.25	1530.53	1547.78	1649.54	1666.79
		CO	4.5	15700	27.71	17.34	1530.53	1547.87	1649.54	1666.88
	R3	CO	0	15700	27.71	17.79	1530.53	1548.32	1649.54	1667.32
		CO	4.5	15700	27.71	18.08	1530.53	1548.61	1649.54	1667.62
	R4	CO	0	15700	27.71	14.80	1530.53	1545.33	1649.54	1664.34
		CO	4.5	15700	27.71	14.79	1530.53	1545.32	1649.54	1664.32
	R5	CO	0	15700	27.71	19.41	1530.53	1549.95	1649.54	1668.95
		CO	4.5	15700	27.71	19.41	1530.53	1549.94	1649.54	1668.95
	R6	CO	0	15700	27.71	15.87	1530.53	1546.40	1649.54	1665.41
		CO	4.5	15700	27.71	15.82	1530.53	1546.35	1649.54	1665.36

Table 21c - 8 h AAQC Concentration at the Receptors of Interest 35% Natural Gas/65% Hydrogen Gas (Full Load Operation)

35% Natural Gas, 65% Hydrogen Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	8 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 8 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 1 - Full Load Operation	R1	CO	0	15700	47.31	40.08	1530.53	1570.61	1649.54	1689.62
		CO	4.5	15700	47.31	40.12	1530.53	1570.65	1649.54	1689.66
	R2	CO	0	15700	47.31	29.45	1530.53	1559.98	1649.54	1678.99
		CO	4.5	15700	47.31	29.60	1530.53	1560.13	1649.54	1679.14
	R3	CO	0	15700	47.31	30.36	1530.53	1560.89	1649.54	1679.90
		CO	4.5	15700	47.31	30.87	1530.53	1561.40	1649.54	1680.41
	R4	CO	0	15700	47.31	25.27	1530.53	1555.80	1649.54	1674.80
		CO	4.5	15700	47.31	25.24	1530.53	1555.77	1649.54	1674.78
	R5	CO	0	15700	47.31	33.14	1530.53	1563.67	1649.54	1682.68
		CO	4.5	15700	47.31	33.14	1530.53	1563.67	1649.54	1682.68
	R6	CO	0	15700	47.31	27.09	1530.53	1557.62	1649.54	1676.63
		CO	4.5	15700	47.31	27.01	1530.53	1557.54	1649.54	1676.55

Table 22a - 8 h AAQC Concentration at the Receptors of Interest 100% Natural Gas (Start-up followed by Full Load Operation)

100% Natural Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	8 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 8 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 2 - Start up Followed by Full Load Operation	R1	CO	0	15700	52.27	44.28	1530.53	1574.81	1649.54	1693.82
		CO	4.5	15700	52.27	44.32	1530.53	1574.85	1649.54	1693.86
	R2	CO	0	15700	52.27	32.54	1530.53	1563.07	1649.54	1682.08
		CO	4.5	15700	52.27	32.70	1530.53	1563.23	1649.54	1682.24
	R3	CO	0	15700	52.27	33.54	1530.53	1564.08	1649.54	1683.08
		CO	4.5	15700	52.27	34.10	1530.53	1564.64	1649.54	1683.64
	R4	CO	0	15700	52.27	27.92	1530.53	1558.45	1649.54	1677.45
		CO	4.5	15700	52.27	27.89	1530.53	1558.42	1649.54	1677.43
	R5	CO	0	15700	52.27	36.62	1530.53	1567.15	1649.54	1686.15
		CO	4.5	15700	52.27	36.61	1530.53	1567.14	1649.54	1686.15
	R6	CO	0	15700	52.27	29.93	1530.53	1560.46	1649.54	1679.47
		CO	4.5	15700	52.27	29.84	1530.53	1560.37	1649.54	1679.38

Table 22b - 8 h AAQC Concentration at the Receptors of Interest 80% Natural Gas/20% Hydrogen Gas (Start-up followed by Full Load Operation)

80% Natural Gas, 20% Hydrogen Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	8 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 8 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 2 - Start up Followed by Full Load Operation	R1	CO	0	15700	26.13	22.14	1530.53	1552.67	1649.54	1671.68
		CO	4.5	15700	26.13	22.16	1530.53	1552.69	1649.54	1671.70
	R2	CO	0	15700	26.13	16.27	1530.53	1546.80	1649.54	1665.80
		CO	4.5	15700	26.13	16.35	1530.53	1546.88	1649.54	1665.89
	R3	CO	0	15700	26.13	16.77	1530.53	1547.30	1649.54	1666.31
		CO	4.5	15700	26.13	17.05	1530.53	1547.58	1649.54	1666.59
	R4	CO	0	15700	26.13	13.95	1530.53	1544.48	1649.54	1663.49
		CO	4.5	15700	26.13	13.94	1530.53	1544.47	1649.54	1663.48
	R5	CO	0	15700	26.13	18.30	1530.53	1548.83	1649.54	1667.84
		CO	4.5	15700	26.13	18.30	1530.53	1548.83	1649.54	1667.84
	R6	CO	0	15700	26.13	14.96	1530.53	1545.49	1649.54	1664.50
		CO	4.5	15700	26.13	14.92	1530.53	1545.45	1649.54	1664.46

Table 22c - 8 h AAQC Concentration at the Receptors of Interest 35% Natural Gas/65% Hydrogen Gas (Start-up followed by Full Load Operation)

35% Natural Gas, 65% Hydrogen Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	8 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 8 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 2 - Start up Followed by Full Load Operation	R1	CO	0	15700	69.72	59.07	1530.53	1589.60	1649.54	1708.60
		CO	4.5	15700	69.72	59.12	1530.53	1589.65	1649.54	1708.66
	R2	CO	0	15700	69.72	43.40	1530.53	1573.93	1649.54	1692.94
		CO	4.5	15700	69.72	43.62	1530.53	1574.15	1649.54	1693.16
	R3	CO	0	15700	69.72	44.74	1530.53	1575.27	1649.54	1694.28
		CO	4.5	15700	69.72	45.49	1530.53	1576.02	1649.54	1695.03
	R4	CO	0	15700	69.72	37.23	1530.53	1567.76	1649.54	1686.77
		CO	4.5	15700	69.72	37.20	1530.53	1567.73	1649.54	1686.73
	R5	CO	0	15700	69.72	48.84	1530.53	1579.37	1649.54	1698.38
		CO	4.5	15700	69.72	48.83	1530.53	1579.36	1649.54	1698.37
	R6	CO	0	15700	69.72	39.92	1530.53	1570.45	1649.54	1689.46
		CO	4.5	15700	69.72	39.80	1530.53	1570.33	1649.54	1689.34

Table 23a - 24 h AAQC Concentration at the Receptors of Interest 100% Natural Gas (Full Load Operation)

100% Natural Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 1 - Full Load Operation	R1	NO_2	0	200	9.55	3.79	46.67	50.47	50.88	54.68
		PM		27	2.17	0.86	27.91	28.77	31.92	32.78
		Benzene		2.3	0.00215	0.00085	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.0000770	0.000031	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.00573	0.0023	0.43	0.44	0.76	0.77
		Toluene		2000	0.0233	0.0092	2.40	2.41	3.69	3.70
		Xylenes		730	0.0115	0.0046	0.98	0.98	1.25	1.25
		NO_2	4.5	200	9.55	3.75	46.67	50.43	50.88	54.64
		PM		27	2.17	0.85	27.91	28.76	31.92	60.68
		Benzene		2.3	0.00215	0.00084	1.16	1.16	1.71	2.87
		1,3 Butadiene		10	0.0000770	0.000030	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.00573	0.0023	0.43	0.44	0.76	1.20
		Toluene		2000	0.0233	0.0092	2.40	2.41	3.69	6.11
		Xylenes		730	0.0115	0.0045	0.98	0.98	1.25	2.23
	R2	NO_2	0	200	9.55	3.47	46.67	50.14	50.88	54.35
		PM		27	2.17	0.79	27.91	28.70	31.92	32.71
		Benzene		2.3	0.00215	0.00078	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.0000770	0.000028	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.00573	0.0021	0.43	0.44	0.76	0.77
		Toluene		2000	0.0233	0.0085	2.40	2.41	3.69	3.70
		Xylenes		730	0.0115	0.0042	0.98	0.98	1.25	1.25
		NO_2	4.5	200	9.55	3.40	46.67	50.07	50.88	54.28
		PM		27	2.17	0.77	27.91	28.68	31.92	60.60
		Benzene		2.3	0.00215	0.00076	1.16	1.16	1.71	2.87
		1,3 Butadiene		10	0.0000770	0.000027	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.00573	0.0020	0.43	0.44	0.76	1.20
		Toluene		2000	0.0233	0.0083	2.40	2.41	3.69	6.11
		Xylenes		730	0.0115	0.0041	0.98	0.98	1.25	2.23
	R3	NO_2	0	200	9.55	4.69	46.67	51.36	50.88	55.57
		PM		27	2.17	1.07	27.91	28.98	31.92	32.98
		Benzene		2.3	0.00215	0.0011	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.0000770	0.000038	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.00573	0.0028	0.43	0.44	0.76	0.77
		Toluene		2000	0.0233	0.011	2.40	2.42	3.69	3.70

100% Natural Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		Xylenes		730	0.0115	0.0056	0.98	0.98	1.25	1.25
		NO_2		200	9.55	4.78	46.67	51.45	50.88	55.66
		PM		27	2.17	1.09	27.91	29.00	31.92	60.91
		Benzene		2.3	0.00215	0.0011	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.0000770	0.000039	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.00573	0.0029	0.43	0.44	0.76	1.20
		Toluene		2000	0.0233	0.012	2.40	2.42	3.69	6.11
		Xylenes		730	0.0115	0.0057	0.98	0.98	1.25	2.23
	R4	NO_2		200	9.55	4.26	46.67	50.93	50.88	55.14
		PM		27	2.17	0.97	27.91	28.88	31.92	32.89
		Benzene		2.3	0.00215	0.0010	1.16	1.16	1.71	1.71
		1,3 Butadiene	0	10	0.0000770	0.000034	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.00573	0.0026	0.43	0.44	0.76	0.77
		Toluene		2000	0.0233	0.010	2.40	2.41	3.69	3.70
		Xylenes		730	0.0115	0.0051	0.98	0.98	1.25	1.25
		NO_2		200	9.55	4.19	46.67	50.86	50.88	55.07
		PM		27	2.17	0.95	27.91	28.86	31.92	60.78
		Benzene		2.3	0.00215	0.00094	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.0000770	0.000034	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.00573	0.0025	0.43	0.44	0.76	1.20
		Toluene		2000	0.0233	0.010	2.40	2.41	3.69	6.11
		Xylenes		730	0.0115	0.0050	0.98	0.98	1.25	2.23
	R5	NO_2		200	9.55	2.36	46.67	49.03	50.88	53.25
		PM		27	2.17	0.54	27.91	28.45	31.92	32.45
		Benzene		2.3	0.00215	0.00053	1.16	1.16	1.71	1.71
		1,3 Butadiene	0	10	0.0000770	0.000019	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.00573	0.0014	0.43	0.44	0.76	0.76
		Toluene		2000	0.0233	0.0058	2.40	2.41	3.69	3.70
		Xylenes		730	0.0115	0.0028	0.98	0.98	1.25	1.25
		NO_2		200	9.55	2.37	46.67	49.04	50.88	53.25
		PM		27	2.17	0.54	27.91	28.45	31.92	60.36
		Benzene		2.3	0.00215	0.00053	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.0000770	0.000019	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.00573	0.0014	0.43	0.44	0.76	1.20
		Toluene		2000	0.0233	0.0058	2.40	2.41	3.69	6.10
		Xylenes		730	0.0115	0.0028	0.98	0.98	1.25	2.23
	R6	NO_2	0	200	9.55	2.57	46.67	49.24	50.88	53.46

100% Natural Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		PM		27	2.17	0.59	27.91	28.49	31.92	32.50
		Benzene		2.3	0.00215	0.00058	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.0000770	0.000021	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.00573	0.0015	0.43	0.44	0.76	0.77
		Toluene		2000	0.0233	0.0063	2.40	2.41	3.69	3.70
		Xylenes		730	0.0115	0.0031	0.98	0.98	1.25	1.25
		NO_2		200	9.55	2.49	46.67	49.16	50.88	53.37
		PM		27	2.17	0.57	27.91	28.47	31.92	60.39
		Benzene		2.3	0.00215	0.00056	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.0000770	0.000020	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.00573	0.0015	0.43	0.44	0.76	1.20
		Toluene		2000	0.0233	0.0061	2.40	2.41	3.69	6.10
		Xylenes		730	0.0115	0.0030	0.98	0.98	1.25	2.23

Table 23b - 24 h AAQC Concentration at the Receptors of Interest 80% Natural Gas/20% Hydrogen Gas (Full Load Operation)

80% Natural Gas, 20% Hydrogen Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 1 - Full Load Operation	R1	NO_2	0	200	13.59	5.40	46.67	52.07	50.88	56.29
		PM		27	2.17	0.86	27.91	28.77	31.92	32.78
		Benzene		2.3	0.0017	0.00068	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000062	0.000024	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0046	0.0018	0.43	0.44	0.76	0.77
		Toluene		2000	0.041	0.016	2.40	2.42	3.69	3.71
		Xylenes		730	0.0092	0.0036	0.98	0.98	1.25	1.25
		NO_2	4.5	200	13.59	5.34	46.67	52.02	50.88	56.23
		PM		27	2.17	0.85	27.91	28.76	31.92	60.68
		Benzene		2.3	0.0017	0.00068	1.16	1.16	1.71	2.87
		1,3 Butadiene		10	0.000062	0.000024	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0046	0.0018	0.43	0.44	0.76	1.20
		Toluene		2000	0.041	0.016	2.40	2.42	3.69	6.11
		Xylenes		730	0.0092	0.0036	0.98	0.98	1.25	2.23
	R2	NO_2	0	200	13.59	4.94	46.67	51.61	50.88	55.82
		PM		27	2.17	0.79	27.91	28.70	31.92	32.71
		Benzene		2.3	0.0017	0.00062	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000062	0.000022	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0046	0.0017	0.43	0.44	0.76	0.77
		Toluene		2000	0.041	0.015	2.40	2.42	3.69	3.71
		Xylenes		730	0.0092	0.0033	0.98	0.98	1.25	1.25
		NO_2	4.5	200	13.59	4.84	46.67	51.51	50.88	55.72
		PM		27	2.17	0.77	27.91	28.68	31.92	60.60
		Benzene		2.3	0.0017	0.00061	1.16	1.16	1.71	2.87
		1,3 Butadiene		10	0.000062	0.000022	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0046	0.0016	0.43	0.44	0.76	1.20
		Toluene		2000	0.041	0.015	2.40	2.42	3.69	6.11
		Xylenes		730	0.0092	0.0033	0.98	0.98	1.25	2.23
	R3	NO_2	0	200	13.59	6.68	46.67	53.35	50.88	57.56
		PM		27	2.17	1.07	27.91	28.98	31.92	32.98
		Benzene		2.3	0.0017	0.00084	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000062	0.000030	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0046	0.0023	0.43	0.44	0.76	0.77
		Toluene		2000	0.041	0.020	2.40	2.42	3.69	3.71

80% Natural Gas, 20% Hydrogen Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		Xylenes		730	0.0092	0.00	0.98	0.98	1.25	1.25
		NO_2		200	13.59	6.80	46.67	53.47	50.88	57.69
		PM		27	2.17	1.09	27.91	29.00	31.92	60.91
		Benzene		2.3	0.0017	0.00086	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000062	0.000031	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0046	0.0023	0.43	0.44	0.76	1.20
		Toluene		2000	0.041	0.021	2.40	2.42	3.69	6.12
		Xylenes		730	0.0092	0.0046	0.98	0.98	1.25	2.23
	R4	NO_2		200	13.59	6.06	46.67	52.73	50.88	56.94
		PM		27	2.17	0.97	27.91	28.88	31.92	32.89
		Benzene		2.3	0.0017	0.00077	1.16	1.16	1.71	1.71
		1,3 Butadiene	0	10	0.000062	0.000027	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0046	0.0020	0.43	0.44	0.76	0.77
		Toluene		2000	0.041	0.018	2.40	2.42	3.69	3.71
		Xylenes		730	0.0092	0.0041	0.98	0.98	1.25	1.25
		NO_2		200	13.59	5.96	46.67	52.63	50.88	56.84
		PM		27	2.17	0.95	27.91	28.86	31.92	60.78
		Benzene		2.3	0.0017	0.00075	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000062	0.000027	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0046	0.0020	0.43	0.44	0.76	1.20
		Toluene		2000	0.041	0.018	2.40	2.42	3.69	6.12
		Xylenes		730	0.0092	0.0040	0.98	0.98	1.25	2.23
	R5	NO_2		200	13.59	3.36	46.67	50.04	50.88	54.25
		PM		27	2.17	0.54	27.91	28.45	31.92	32.45
		Benzene		2.3	0.0017	0.00043	1.16	1.16	1.71	1.71
		1,3 Butadiene	0	10	0.000062	0.000015	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0046	0.0011	0.43	0.44	0.76	0.76
		Toluene		2000	0.041	0.010	2.40	2.41	3.69	3.70
		Xylenes		730	0.0092	0.0023	0.98	0.98	1.25	1.25
		NO_2		200	13.59	3.37	46.67	50.04	50.88	54.26
		PM		27	2.17	0.54	27.91	28.45	31.92	60.36
		Benzene		2.3	0.0017	0.00043	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000062	0.000015	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0046	0.0011	0.43	0.44	0.76	1.20
		Toluene		2000	0.041	0.0102	2.40	2.41	3.69	6.11
		Xylenes		730	0.0092	0.0023	0.98	0.98	1.25	2.23
	R6	NO_2	0	200	13.59	3.66	46.67	50.33	50.88	54.55

80% Natural Gas, 20% Hydrogen Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		PM		27	2.17	0.59	27.91	28.49	31.92	32.50
		Benzene		2.3	0.0017	0.00046	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000062	0.000017	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0046	0.0012	0.43	0.44	0.76	0.76
		Toluene		2000	0.041	0.011	2.40	2.41	3.69	3.70
		Xylenes		730	0.0092	0.0025	0.98	0.98	1.25	1.25
		NO_2		200	13.59	3.54	46.67	50.21	50.88	54.42
		PM		27	2.17	0.57	27.91	28.47	31.92	60.39
		Benzene		2.3	0.0017	0.00045	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000062	0.000016	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0046	0.0012	0.43	0.44	0.76	1.20
		Toluene		2000	0.041	0.011	2.40	2.41	3.69	6.11
		Xylenes		730	0.0092	0.0024	0.98	0.98	1.25	2.23

Table 23c - 24 h AAQC Concentration at the Receptors of Interest 35% Natural Gas/65% Hydrogen Gas (Full Load Operation)

35% Natural Gas, 65% Hydrogen Gas, Steam Injection										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 1 - Full Load Operation	R1	NO_2	0	200	20.27	8.06	46.67	54.73	50.88	58.94
		PM		27	2.17	0.86	27.91	28.77	31.92	32.78
		Benzene		2	0.00075	0.00030	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000027	0.000011	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0020	0.00080	0.43	0.43	0.76	0.76
		Toluene		2000	0.018	0.0071	2.40	2.41	3.69	3.70
		Xylenes		730	0.0040	0.0016	0.98	0.98	1.25	1.25
		NO_2	4.5	200	20.27	7.97	46.67	54.64	50.88	58.85
		PM		27	2.17	0.85	27.91	28.76	31.92	60.68
		Benzene		2	0.00075	0.00030	1.16	1.16	1.71	2.87
		1,3 Butadiene		10	0.000027	0.000011	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0020	0.00079	0.43	0.43	0.76	1.20
		Toluene		2000	0.018	0.0071	2.40	2.41	3.69	6.10
		Xylenes		730	0.0040	0.0016	0.98	0.98	1.25	2.23
	R2	NO_2	0	200	20.27	7.37	46.67	54.04	50.88	58.25
		PM		27	2.17	0.79	27.91	28.70	31.92	32.71
		Benzene		2	0.00075	0.00027	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000027	0.000010	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0020	0.00073	0.43	0.43	0.76	0.76
		Toluene		2000	0.018	0.0065	2.40	2.41	3.69	3.70
		Xylenes		730	0.0040	0.0015	0.98	0.98	1.25	1.25
		NO_2	4.5	200	20.27	7.21	46.67	53.89	50.88	58.10
		PM		27	2.17	0.77	27.91	28.68	31.92	60.60
		Benzene		2	0.00075	0.00027	1.16	1.16	1.71	2.87
		1,3 Butadiene		10	0.000027	0.000010	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0020	0.00071	0.43	0.43	0.76	1.20
		Toluene		2000	0.018	0.0064	2.40	2.41	3.69	6.10
		Xylenes		730	0.0040	0.0014	0.98	0.98	1.25	2.23
	R3	NO_2	0	200	20.27	9.96	46.67	56.63	50.88	60.84
		PM		27	2.17	1.07	27.91	28.98	31.92	32.98
		Benzene		2	0.00075	0.00037	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000027	0.000013	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0020	0.0010	0.43	0.44	0.76	0.76
		Toluene		2000	0.018	0.0088	2.40	2.41	3.69	3.70

35% Natural Gas, 65% Hydrogen Gas, Steam Injection										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		Xylenes		730	0.0040	0.0020	0.98	0.98	1.25	1.25
		NO_2		200	20.27	10.15	46.67	56.82	50.88	61.03
		PM		27	2.17	1.09	27.91	29.00	31.92	60.91
		Benzene		2	0.00075	0.00038	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000027	0.000013	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0020	0.0010	0.43	0.44	0.76	1.20
		Toluene		2000	0.018	0.0090	2.40	2.41	3.69	6.11
		Xylenes		730	0.0040	0.0020	0.98	0.98	1.25	2.23
	R4	NO_2		200	20.27	9.04	46.67	55.71	50.88	59.92
		PM		27	2.17	0.97	27.91	28.88	31.92	32.89
		Benzene		2	0.00075	0.00034	1.16	1.16	1.71	1.71
		1,3 Butadiene	0	10	0.000027	0.000012	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0020	0.00089	0.43	0.44	0.76	0.76
		Toluene		2000	0.018	0.0080	2.40	2.41	3.69	3.70
		Xylenes		730	0.0040	0.0018	0.98	0.98	1.25	1.25
		NO_2		200	20.27	8.89	46.67	55.56	50.88	59.77
		PM		27	2.17	0.95	27.91	28.86	31.92	60.78
		Benzene		2	0.00075	0.00033	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000027	0.000012	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0020	0.00088	0.43	0.43	0.76	1.20
		Toluene		2000	0.018	0.0079	2.40	2.41	3.69	6.11
		Xylenes		730	0.0040	0.0018	0.98	0.98	1.25	2.23
	R5	NO_2		200	20.27	5.02	46.67	51.69	50.88	55.90
		PM		27	2.17	0.54	27.91	28.45	31.92	32.45
		Benzene		2	0.00075	0.00019	1.16	1.16	1.71	1.71
		1,3 Butadiene	0	10	0.000027	0.0000067	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0020	0.00050	0.43	0.43	0.76	0.76
		Toluene		2000	0.018	0.0044	2.40	2.41	3.69	3.70
		Xylenes		730	0.0040	0.0010	0.98	0.98	1.25	1.25
		NO_2		200	20.27	5.03	46.67	51.70	50.88	55.91
		PM		27	2.17	0.54	27.91	28.45	31.92	60.36
		Benzene		2	0.00075	0.00019	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000027	0.0000067	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0020	0.00050	0.43	0.43	0.76	1.20
		Toluene		2000	0.018	0.0045	2.40	2.41	3.69	6.10
		Xylenes		730	0.0040	0.0010	0.98	0.98	1.25	2.23

35% Natural Gas, 65% Hydrogen Gas, Steam Injection										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
	R6	NO_2	0	200	20.27	5.46	46.67	52.14	50.88	56.35
		PM		27	2.17	0.59	27.91	28.49	31.92	32.50
		Benzene		2	0.00075	0.00020	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000027	0.0000073	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0020	0.00054	0.43	0.43	0.76	0.76
		Toluene		2000	0.018	0.0048	2.40	2.41	3.69	3.70
		Xylenes		730	0.0040	0.0011	0.98	0.98	1.25	1.25
		NO_2	4.5	200	20.27	5.28	46.67	51.95	50.88	56.17
		PM		27	2.17	0.57	27.91	28.47	31.92	60.39
		Benzene		2	0.00075	0.00020	1.16	1.16	1.71	2.87
		1,3 Butadiene		10	0.000027	0.0000070	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0020	0.00052	0.43	0.43	0.76	1.20
		Toluene		2000	0.018	0.0047	2.40	2.41	3.69	6.10
		Xylenes		730	0.0040	0.0010	0.98	0.98	1.25	2.23

Table 24a - 24 h AAQC Concentration at the Receptors of Interest 100% Natural Gas (Start-up followed by Full Load Operation)

100% Natural Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 2 - Start up Followed by Full Load Operation	R1	NO_2	0	200	11.01	4.38	46.67	51.05	50.88	55.26
		PM		27	2.13	0.85	27.91	28.76	31.92	32.76
		Benzene		2.3	0.0021	0.00085	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000077	0.000031	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0057	0.0023	0.43	0.44	0.76	0.77
		Toluene		2000	0.023	0.0092	2.40	2.41	3.69	3.70
		Xylenes		730	0.011	0.0046	0.98	0.98	1.25	1.25
		NO_2	4.5	200	11.01	4.33	46.67	51.00	50.88	55.21
		PM		27	2.13	0.84	27.91	28.75	31.92	60.66
		Benzene		2.3	0.0021	0.00084	1.16	1.16	1.71	2.87
		1,3 Butadiene		10	0.000077	0.000030	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0057	0.0023	0.43	0.44	0.76	1.20
		Toluene		2000	0.023	0.0092	2.40	2.41	3.69	6.11
		Xylenes		730	0.011	0.0045	0.98	0.98	1.25	2.23
	R2	NO_2	0	200	11.01	4.00	46.67	50.67	50.88	54.89
		PM		27	2.13	0.77	27.91	28.68	31.92	32.69
		Benzene		2.3	0.0021	0.00078	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000077	0.000028	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0057	0.0021	0.43	0.44	0.76	0.77
		Toluene		2000	0.023	0.0085	2.40	2.41	3.69	3.70
		Xylenes		730	0.011	0.0042	0.98	0.98	1.25	1.25
		NO_2	4.5	200	11.01	3.92	46.67	50.59	50.88	54.80
		PM		27	2.13	0.76	27.91	28.67	31.92	60.58
		Benzene		2.3	0.0021	0.00076	1.16	1.16	1.71	2.87
		1,3 Butadiene		10	0.000077	0.000027	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0057	0.0020	0.43	0.44	0.76	1.20
		Toluene		2000	0.023	0.0083	2.40	2.41	3.69	6.11
		Xylenes		730	0.011	0.0041	0.98	0.98	1.25	2.23
	R3	NO_2	0	200	11.01	5.41	46.67	52.08	50.88	56.29
		PM		27	2.13	1.05	27.91	28.96	31.92	32.96
		Benzene		2.3	0.0021	0.0011	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000077	0.000038	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0057	0.0028	0.43	0.44	0.76	0.77
		Toluene		2000	0.023	0.011	2.40	2.42	3.69	3.70

100% Natural Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		Xylenes		730	0.011	0.0056	0.98	0.98	1.25	1.25
		NO_2		200	11.01	5.51	46.67	52.18	50.88	56.40
		PM		27	2.13	1.07	27.91	28.98	31.92	60.89
		Benzene		2.3	0.0021	0.0011	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000077	0.000039	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0057	0.0029	0.43	0.44	0.76	1.20
		Toluene		2000	0.023	0.012	2.40	2.42	3.69	6.11
		Xylenes		730	0.011	0.0057	0.98	0.98	1.25	2.23
	R4	NO_2		200	11.01	4.91	46.67	51.58	50.88	55.79
		PM		27	2.13	0.95	27.91	28.86	31.92	32.87
		Benzene		2.3	0.0021	0.0010	1.16	1.16	1.71	1.71
		1,3 Butadiene	0	10	0.000077	0.000034	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0057	0.0026	0.43	0.44	0.76	0.77
		Toluene		2000	0.023	0.010	2.40	2.41	3.69	3.70
		Xylenes		730	0.011	0.0051	0.98	0.98	1.25	1.25
		NO_2		200	11.01	4.83	46.67	51.50	50.88	55.71
		PM		27	2.13	0.94	27.91	28.84	31.92	60.76
		Benzene		2.3	0.0021	0.00094	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000077	0.000034	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0057	0.0025	0.43	0.44	0.76	1.20
		Toluene		2000	0.023	0.010	2.40	2.41	3.69	6.11
		Xylenes		730	0.011	0.0050	0.98	0.98	1.25	2.23
	R5	NO_2		200	11.01	2.73	46.67	49.40	50.88	53.61
		PM		27	2.13	0.53	27.91	28.44	31.92	32.44
		Benzene		2.3	0.0021	0.00053	1.16	1.16	1.71	1.71
		1,3 Butadiene	0	10	0.000077	0.000019	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0057	0.0014	0.43	0.44	0.76	0.76
		Toluene		2000	0.023	0.0058	2.40	2.41	3.69	3.70
		Xylenes		730	0.011	0.0028	0.98	0.98	1.25	1.25
		NO_2		200	11.01	2.73	46.67	49.40	50.88	53.62
		PM		27	2.13	0.53	27.91	28.44	31.92	60.35
		Benzene		2.3	0.0021	0.00053	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000077	0.000019	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0057	0.0014	0.43	0.44	0.76	1.20
		Toluene		2000	0.023	0.0058	2.40	2.41	3.69	6.10
		Xylenes		730	0.011	0.0028	0.98	0.98	1.25	2.23
	R6	NO_2	0	200	11.01	2.97	46.67	49.64	50.88	53.85

100% Natural Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		PM		27	2.13	0.57	27.91	28.48	31.92	32.49
		Benzene		2.3	0.0021	0.00058	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000077	0.000021	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0057	0.0015	0.43	0.44	0.76	0.77
		Toluene		2000	0.023	0.0063	2.40	2.41	3.69	3.70
		Xylenes		730	0.011	0.0031	0.98	0.98	1.25	1.25
		NO_2		200	11.01	2.87	46.67	49.54	50.88	53.75
		PM		27	2.13	0.56	27.91	28.46	31.92	60.38
		Benzene		2.3	0.0021	0.00056	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000077	0.000020	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0057	0.0015	0.43	0.44	0.76	1.20
		Toluene		2000	0.023	0.0061	2.40	2.41	3.69	6.10
		Xylenes		730	0.011	0.0030	0.98	0.98	1.25	2.23

Table 24b - 24 h AAQC Concentration at the Receptors of Interest 80% Natural Gas/20% Natural Gas (Start-up followed by Full Load Operation)

80% Natural Gas,20% Hydrogen Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 2 - Start up Followed by Full Load Operation	R1	NO_2	0	200	14.16	5.63	46.67	52.30	50.88	56.51
		PM		27	2.13	0.85	27.91	28.76	31.92	32.76
		Benzene		2.3	0.0017	0.00068	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000062	0.000024	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0046	0.0018	0.43	0.44	0.76	0.77
		Toluene		2000	0.019	0.0074	2.40	2.41	3.69	3.70
		Xylenes		730	0.0092	0.0036	0.98	0.98	1.25	1.25
		NO_2	4.5	200	14.16	5.57	46.67	52.24	50.88	56.45
		PM		27	2.13	0.84	27.91	28.75	31.92	60.66
		Benzene		2.3	0.0017	0.00068	1.16	1.16	1.71	2.87
		1,3 Butadiene		10	0.000062	0.000024	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0046	0.0018	0.43	0.44	0.76	1.20
		Toluene		2000	0.019	0.0073	2.40	2.41	3.69	6.10
		Xylenes		730	0.0092	0.0036	0.98	0.98	1.25	2.23
	R2	NO_2	0	200	14.16	5.14	46.67	51.81	50.88	56.03
		PM		27	2.13	0.77	27.91	28.68	31.92	32.69
		Benzene		2.3	0.0017	0.00062	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000062	0.000022	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0046	0.0017	0.43	0.44	0.76	0.77
		Toluene		2000	0.019	0.0068	2.40	2.41	3.69	3.70
		Xylenes		730	0.0092	0.0033	0.98	0.98	1.25	1.25
		NO_2	4.5	200	14.16	5.04	46.67	51.71	50.88	55.92
		PM		27	2.13	0.76	27.91	28.67	31.92	60.58
		Benzene		2.3	0.0017	0.00061	1.16	1.16	1.71	2.87
		1,3 Butadiene		10	0.000062	0.000022	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0046	0.0016	0.43	0.44	0.76	1.20
		Toluene		2000	0.019	0.0066	2.40	2.41	3.69	6.10
		Xylenes		730	0.0092	0.0033	0.98	0.98	1.25	2.23
	R3	NO_2	0	200	14.16	6.96	46.67	53.63	50.88	57.84
		PM		27	2.13	1.05	27.91	28.96	31.92	32.96
		Benzene		2.3	0.0017	0.00084	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000062	0.000030	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0046	0.0023	0.43	0.44	0.76	0.77
		Toluene		2000	0.019	0.0091	2.40	2.41	3.69	3.70

80% Natural Gas,20% Hydrogen Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		Xylenes		730	0.0092	0.0045	0.98	0.98	1.25	1.25
		NO_2		200	14.16	7.09	46.67	53.76	50.88	57.97
		PM		27	2.13	1.07	27.91	28.98	31.92	60.89
		Benzene		2.3	0.0017	0.00086	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000062	0.000031	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0046	0.0023	0.43	0.44	0.76	1.20
		Toluene		2000	0.019	0.0093	2.40	2.41	3.69	6.11
		Xylenes		730	0.0092	0.0046	0.98	0.98	1.25	2.23
	R4	NO_2		200	14.16	6.31	46.67	52.98	50.88	57.19
		PM		27	2.13	0.95	27.91	28.86	31.92	32.87
		Benzene		2.3	0.0017	0.00077	1.16	1.16	1.71	1.71
		1,3 Butadiene	0	10	0.000062	0.000027	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0046	0.0020	0.43	0.44	0.76	0.77
		Toluene		2000	0.019	0.0083	2.40	2.41	3.69	3.70
		Xylenes		730	0.0092	0.0041	0.98	0.98	1.25	1.25
		NO_2		200	14.16	6.21	46.67	52.88	50.88	57.09
		PM		27	2.13	0.94	27.91	28.84	31.92	60.76
		Benzene		2.3	0.0017	0.00075	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000062	0.000027	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0046	0.0020	0.43	0.44	0.76	1.20
		Toluene		2000	0.019	0.0082	2.40	2.41	3.69	6.11
		Xylenes		730	0.0092	0.0040	0.98	0.98	1.25	2.23
	R5	NO_2		200	14.16	3.51	46.67	50.18	50.88	54.39
		PM		27	2.13	0.53	27.91	28.44	31.92	32.44
		Benzene		2.3	0.0017	0.00043	1.16	1.16	1.71	1.71
		1,3 Butadiene	0	10	0.000062	0.000015	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0046	0.0011	0.43	0.44	0.76	0.76
		Toluene		2000	0.019	0.0046	2.40	2.41	3.69	3.70
		Xylenes		730	0.0092	0.0023	0.98	0.98	1.25	1.25
		NO_2		200	14.16	3.51	46.67	50.18	50.88	54.40
		PM		27	2.13	0.53	27.91	28.44	31.92	60.35
		Benzene		2.3	0.0017	0.00043	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000062	0.000015	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0046	0.0011	0.43	0.44	0.76	1.20
		Toluene		2000	0.019	0.0046	2.40	2.41	3.69	6.10
		Xylenes		730	0.0092	0.0023	0.98	0.98	1.25	2.23
	R6	NO_2	0	200	14.16	3.82	46.67	50.49	50.88	54.70

80% Natural Gas,20% Hydrogen Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		PM		27	2.13	0.57	27.91	28.48	31.92	32.49
		Benzene		2.3	0.0017	0.00046	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000062	0.000017	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0046	0.0012	0.43	0.44	0.76	0.76
		Toluene		2000	0.019	0.0050	2.40	2.41	3.69	3.70
		Xylenes		730	0.0092	0.0025	0.98	0.98	1.25	1.25
		NO_2		200	14.16	3.69	46.67	50.36	50.88	54.57
		PM		27	2.13	0.56	27.91	28.46	31.92	60.38
		Benzene		2.3	0.0017	0.00045	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000062	0.000016	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0046	0.0012	0.43	0.44	0.76	1.20
		Toluene		2000	0.019	0.0049	2.40	2.41	3.69	6.10
		Xylenes		730	0.0092	0.0024	0.98	0.98	1.25	2.23

Table 24c - 24 h AAQC Concentration at the Receptors of Interest 35% Natural Gas/65% Natural Gas (Start-up followed by Full Load Operation)

35% Natural Gas, 65% Hydrogen Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 2 - Start up Followed by Full Load Operation	R1	NO_2	0	200	20.22	8.04	46.67	54.71	50.88	58.92
		PM		27	2.13	0.85	27.91	28.76	31.92	32.76
		Benzene		2.3	0.00075	0.00030	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000027	0.000011	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0020	0.00080	0.43	0.43	0.76	0.76
		Toluene		2000	0.0081	0.0032	2.40	2.41	3.69	3.70
		Xylenes		730	0.0040	0.0016	0.98	0.98	1.25	1.25
		NO_2	4.5	200	20.22	7.95	46.67	54.62	50.88	58.83
		PM		27	2.13	0.84	27.91	28.75	31.92	60.66
		Benzene		2.3	0.00075	0.00030	1.16	1.16	1.71	2.87
		1,3 Butadiene		10	0.000027	0.000011	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0020	0.00079	0.43	0.43	0.76	1.20
		Toluene		2000	0.0081	0.0032	2.40	2.41	3.69	6.10
		Xylenes		730	0.0040	0.0016	0.98	0.98	1.25	2.23
	R2	NO_2	0	200	20.22	7.35	46.67	54.02	50.88	58.23
		PM		27	2.13	0.77	27.91	28.68	31.92	32.69
		Benzene		2.3	0.00075	0.00027	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000027	0.000010	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0020	0.00073	0.43	0.43	0.76	0.76
		Toluene		2000	0.0081	0.0030	2.40	2.41	3.69	3.70
		Xylenes		730	0.0040	0.0015	0.98	0.98	1.25	1.25
		NO_2	4.5	200	20.22	7.20	46.67	53.87	50.88	58.08
		PM		27	2.13	0.76	27.91	28.67	31.92	60.58
		Benzene		2.3	0.00075	0.00027	1.16	1.16	1.71	2.87
		1,3 Butadiene		10	0.000027	0.000010	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0020	0.00071	0.43	0.43	0.76	1.20
		Toluene		2000	0.0081	0.0029	2.40	2.41	3.69	6.10
		Xylenes		730	0.0040	0.0014	0.98	0.98	1.25	2.23
	R3	NO_2	0	200	20.22	9.93	46.67	56.60	50.88	60.82
		PM		27	2.13	1.05	27.91	28.96	31.92	32.96
		Benzene		2.3	0.00075	0.00037	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000027	0.000013	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0020	0.00098	0.43	0.44	0.76	0.76
		Toluene		2000	0.0081	0.0040	2.40	2.41	3.69	3.70

35% Natural Gas, 65% Hydrogen Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		Xylenes		730	0.0040	0.0020	0.98	0.98	1.25	1.25
		NO_2		200	20.22	10.12	46.67	56.79	50.88	61.00
		PM		27	2.13	1.07	27.91	28.98	31.92	60.89
		Benzene		2.3	0.00075	0.00038	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000027	0.000013	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0020	0.0010	0.43	0.44	0.76	1.20
		Toluene		2000	0.0081	0.0041	2.40	2.41	3.69	6.10
		Xylenes		730	0.0040	0.0020	0.98	0.98	1.25	2.23
	R4	NO_2		200	20.22	9.01	46.67	55.68	50.88	59.89
		PM		27	2.13	0.95	27.91	28.86	31.92	32.87
		Benzene		2.3	0.00075	0.00034	1.16	1.16	1.71	1.71
		1,3 Butadiene	0	10	0.000027	0.000012	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0020	0.00089	0.43	0.44	0.76	0.76
		Toluene		2000	0.0081	0.0036	2.40	2.41	3.69	3.70
		Xylenes		730	0.0040	0.0018	0.98	0.98	1.25	1.25
		NO_2		200	20.22	8.87	46.67	55.54	50.88	59.75
		PM		27	2.13	0.94	27.91	28.84	31.92	60.76
		Benzene		2.3	0.00075	0.00033	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000027	0.000012	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0020	0.00088	0.43	0.43	0.76	1.20
		Toluene		2000	0.0081	0.0036	2.40	2.41	3.69	6.10
		Xylenes		730	0.0040	0.0018	0.98	0.98	1.25	2.23
	R5	NO_2		200	20.22	5.01	46.67	51.68	50.88	55.89
		PM		27	2.13	0.53	27.91	28.44	31.92	32.44
		Benzene		2.3	0.00075	0.00019	1.16	1.16	1.71	1.71
		1,3 Butadiene	0	10	0.000027	0.0000067	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0020	0.00050	0.43	0.43	0.76	0.76
		Toluene		2000	0.0081	0.0020	2.40	2.41	3.69	3.70
		Xylenes		730	0.0040	0.0010	0.98	0.98	1.25	1.25
		NO_2		200	20.22	5.02	46.67	51.69	50.88	55.90
		PM		27	2.13	0.53	27.91	28.44	31.92	60.35
		Benzene		2.3	0.00075	0.00019	1.16	1.16	1.71	2.87
		1,3 Butadiene	4.5	10	0.000027	0.0000067	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0020	0.00050	0.43	0.43	0.76	1.20
		Toluene		2000	0.0081	0.0020	2.40	2.41	3.69	6.10
		Xylenes		730	0.0040	0.0010	0.98	0.98	1.25	2.23

35% Natural Gas, 65% Hydrogen Gas										
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	24 h AAQC (ug/m^3)	Total Facility Emission Rate (g/s)	Max. 24 h Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
							Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
	R6	NO_2	0	200	20.22	5.45	46.67	52.12	50.88	56.33
		PM		27	2.13	0.57	27.91	28.48	31.92	32.49
		Benzene		2.3	0.00075	0.00020	1.16	1.16	1.71	1.71
		1,3 Butadiene		10	0.000027	0.0000073	0.21	0.21	0.34	0.34
		Ethyl Benzene		1000	0.0020	0.00054	0.43	0.43	0.76	0.76
		Toluene		2000	0.0081	0.0022	2.40	2.41	3.69	3.70
		Xylenes		730	0.0040	0.0011	0.98	0.98	1.25	1.25
		NO_2	4.5	200	20.22	5.27	46.67	51.94	50.88	56.15
		PM		27	2.13	0.56	27.91	28.46	31.92	60.38
		Benzene		2.3	0.00075	0.00020	1.16	1.16	1.71	2.87
		1,3 Butadiene		10	0.000027	0.0000070	0.21	0.21	0.34	0.55
		Ethyl Benzene		1000	0.0020	0.00052	0.43	0.43	0.76	1.20
		Toluene		2000	0.0081	0.0021	2.40	2.41	3.69	6.10
		Xylenes		730	0.0040	0.0010	0.98	0.98	1.25	2.23

Table 25a - Annual AAQC and CAAQS Concentration at the Receptors of Interest 100% Natural Gas (Full Load Operation)

100% Natural Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	Annual AAQC (ug/m^3)	2025 Annual CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. Annual Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 1 - Full Load Operation	R1	NO_2	0	N/A	23.5	9.55	4.77E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	9.55	4.77E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0.00	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.1730	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.16
	R2	NO_2	0	N/A	23.5	9.55	4.77E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	9.55	4.77E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0.00	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.1730	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.16
	R3	NO_2	0	N/A	23.5	9.55	4.77E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	9.55	4.77E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0.00	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.1730	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.16
	R4	NO_2	0	N/A	23.5	9.55	4.77E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	0.70

100% Natural Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	Annual AAQC (ug/m^3)	2025 Annual CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. Annual Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	9.55	4.77E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0.00	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.1730	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.16
	R5	NO_2		N/A	23.5	9.55	4.77E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM	0	8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	9.55	4.77E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0.00	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.1730	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.16
	R6	NO_2		N/A	23.5	9.55	4.77E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM	0	8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	9.55	4.77E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0.00	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.1730	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.16

Table 25b - Annual AAQC and CAAQS Concentration at the Receptors of Interest 80% Natural Gas/20% Hydrogen Gas (Full Load Operation)

80% Natural Gas,20% Hydrogen Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	Annual AAQC (ug/m^3)	2025 Annual CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. Annual Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 1 - Full Load Operation	R1	NO_2	0	N/A	23.5	13.59	6.79E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	13.59	6.79E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.16
	R2	NO_2	0	N/A	23.5	13.59	6.79E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	13.59	6.79E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.16
	R3	NO_2	0	N/A	23.5	13.59	6.79E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	13.59	6.79E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.16
	R4	NO_2	0	N/A	23.5	13.59	6.79E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	0.70

80% Natural Gas,20% Hydrogen Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	Annual AAQC (ug/m^3)	2025 Annual CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. Annual Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	13.59	6.79E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.16
	R5	NO_2		N/A	23.5	13.59	6.79E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM	0	8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	13.59	6.79E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.16
	R6	NO_2		N/A	23.5	13.59	6.79E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM	0	8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	13.59	6.79E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.16

Table 25c - Annual AAQC and CAAQS Concentration at the Receptors of Interest 35% Natural Gas/65% Hydrogen Gas (Full Load Operation)

35% Natural Gas, 65% Hydrogen Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	Annual AAQC (ug/m^3)	2025 Annual CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. Annual Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 1 - Full Load Operation	R1	NO_2	0	N/A	23.5	20.27	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	20.27	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.16
	R2	NO_2	0	N/A	23.5	20.27	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	20.27	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.16
	R3	NO_2	0	N/A	23.5	20.27	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	20.27	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.16
	R4	NO_2	0	N/A	23.5	20.27	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	0.70

35% Natural Gas, 65% Hydrogen Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	Annual AAQC (ug/m^3)	2025 Annual CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. Annual Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	20.27	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.16
	R5	NO_2		N/A	23.5	20.27	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM	0	8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	20.27	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.16
	R6	NO_2		N/A	23.5	20.27	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM	0	8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	20.27	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.17	1.09E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.16

Table 26a - Annual AAQC and CAAQS Concentration at the Receptors of Interest 100% Natural Gas (Start-up followed by Full Load Operation)

100% Natural Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	Annual AAQC (ug/m^3)	2025 Annual CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. Annual Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 2 - Start up Followed by Full Load Operation	R1	NO_2	0	N/A	23.5	11.01	5.51E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	11.01	5.51E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0.00	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.1326	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.16
	R2	NO_2	0	N/A	23.5	11.01	5.51E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	11.01	5.51E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0.00	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.1326	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.16
	R3	NO_2	0	N/A	23.5	11.01	5.51E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	11.01	5.51E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0.00	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.1326	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.16
	R4	NO_2	0	N/A	23.5	11.01	5.51E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	0.70

100% Natural Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	Annual AAQC (ug/m^3)	2025 Annual CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. Annual Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	11.01	5.51E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0.00	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.1326	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.16
	R5	NO_2		N/A	23.5	11.01	5.51E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM	0	8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	11.01	5.51E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0.00	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.1326	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.16
	R6	NO_2		N/A	23.5	11.01	5.51E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM	0	8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	11.01	5.51E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0.00	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.1326	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0021	1.07E-08	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000077	3.85E-10	0.07	0.07	0.09	0.16

Table 26b - Annual AAQC and CAAQS Concentration at the Receptors of Interest 80% Natural Gas/20% Hydrogen Gas (Start-up followed by Full Load Operation)

80% Natural Gas,20% Hydrogen Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	Annual AAQC (ug/m^3)	2025 Annual CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. Annual Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 2 - Start up Followed by Full Load Operation	R1	NO_2	0	N/A	23.5	14.16	7.08E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	14.16	7.08E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.16
	R2	NO_2	0	N/A	23.5	14.16	7.08E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	14.16	7.08E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.16
	R3	NO_2	0	N/A	23.5	14.16	7.08E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	14.16	7.08E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.16
	R4	NO_2	0	N/A	23.5	14.16	7.08E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	0.70

80% Natural Gas,20% Hydrogen Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	Annual AAQC (ug/m^3)	2025 Annual CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. Annual Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	14.16	7.08E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.16
	R5	NO_2		N/A	23.5	14.16	7.08E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM	0	8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	14.16	7.08E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.16
	R6	NO_2		N/A	23.5	14.16	7.08E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM	0	8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	14.16	7.08E-05	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.0017	8.59E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000062	3.08E-10	0.07	0.07	0.09	0.16

Table 26c - Annual AAQC and CAAQS Concentration at the Receptors of Interest 35% Natural Gas/65% Hydrogen Gas (Start-up followed by Full Load Operation)

35% Natural Gas, 65% Hydrogen Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	Annual AAQC (ug/m^3)	2025 Annual CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. Annual Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
Scenario 2 - Start up Followed by Full Load Operation	R1	NO_2	0	N/A	23.5	20.22	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	20.22	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.16
	R2	NO_2	0	N/A	23.5	20.22	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	20.22	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.16
	R3	NO_2	0	N/A	23.5	20.22	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.09
		NO_2	4.5	N/A	23.5	20.22	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.16
	R4	NO_2	0	N/A	23.5	20.22	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM		8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	0.70

35% Natural Gas, 65% Hydrogen Gas											
Scenario	Receptor	Contaminant	Flag Pole Elevation (m)	Annual AAQC (ug/m^3)	2025 Annual CAAQS (ug/m^3)	Total Facility Emission Rate (g/s)	Max. Annual Concentration (ug/m^3)	Average 90th Percentile (2016 through 2020)		Maximum 90th Percentile (2016 through 2020)	
								Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)	Ambient Levels (ug/m^3)	Combined Effect (ug/m^3)
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	20.22	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.16
	R5	NO_2		N/A	23.5	20.22	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM	0	8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	20.22	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.16
	R6	NO_2		N/A	23.5	20.22	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0.00	5.04	5.04	5.44	5.44
		PM	0	8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	7.35
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	0.70
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.09
		NO_2		N/A	23.5	20.22	1.01E-04	13.87	13.87	15.00	15.00
		SO_2		10.6	N/A	0	0	5.04	5.04	5.44	5.44
		PM	4.5	8.8	N/A	2.13	1.07E-05	7.10	7.10	7.35	14.45
		Benzene		0.45	N/A	0.00075	3.76E-09	0.57	0.57	0.70	1.27
		1,3 Butadiene		2	N/A	0.000027	1.35E-10	0.07	0.07	0.09	0.16

9.7 Potential Air Quality Impacts During Construction

During the construction phase of the proposed HRPP, the emissions of oxides of nitrogen, carbon monoxide, sulphur dioxide, and VOCs will result from the fuel combustion of construction equipment and other vehicles. These are typical for all types of construction. Generally, there will be 10 construction vehicles running in any one time, with a minimum of about 3 vehicles. There will also be an increase vehicular traffic in the area due equipment and construction supply deliveries to the site. These are estimated to be about 15 deliveries per

week. These additional emissions will occur during weekdays, generally from 7:00 in the morning to 4:00 in the afternoon, during the 2 to 3 years of construction.

Construction equipment are typically well maintained for both health and safety reasons and will not be left idling when not in use. These precautions will minimize combustion emissions to the air.

Dust is also one of the potential air emissions. Following standard practices in construction, dust emissions will be minimized by wetting the ground surfaces.

In light of the distances to the critical receptors and the number of vehicles involved, the impact to the addition to the background values would be minimal.

9.8 Cooling Tower and Stack Moisture Plume Analysis Results

A detailed analysis and conclusion for the cooling tower moisture plume and icing analysis can be found in Appendix A of this report. The analyses shows that the potential icing events on Highway 40 and Oil Springs Line are expected to be 1% of the time in a year and therefore can be considered insignificant in terms of adverse impacts on Highway 40 and Oil Springs Line.

10.0 Conclusions

The emissions from the Hydrogen Ready will meet the MECP Guideline A-5 for limits of oxides of nitrogen, carbon monoxide, and sulphur dioxide emissions. The AERMOD modeling has shown that the emissions from the Hydrogen Ready will meet the Ontario Regulation 419/05 point of impingement criteria. The analyses also showed that the air emissions from the proposed power plant will be below the O.Reg. 419/05 POI criteria under all normal operating conditions, during start up conditions followed by full load operations and under worst-case meteorological conditions. The analyses also showed that the point of impingement contaminant concentrations at the receptors of interest will be well below the POI permissible criteria. The analyses also showed that the proposed power plant's air emissions in terms of their influence on local ambient air quality data will be only slight and only in the local vicinity of the facility and, are unlikely to contribute to any short-term exceedances of MECP Ambient Air Quality Criteria. The analyses shows that the impact of the proposed facility on medium-term air quality will also not result in any exceedances of the MECP Ambient Air Quality Criteria, but occasionally, very small exceedances of the interim 24 h PM2.5 will occur. Existing ambient air quality will be affected only slightly and only close to the operating facility. Nitrogen oxides, carbon monoxide, sulphur dioxide and PM (assumed to be 100% PM2.5) emissions from the proposed power plant will increase the concentration of these contaminants only slightly only in the immediate vicinity of the facility.

Due to the small contribution of the project to ambient NO_2 concentrations, the potential for contribution of the project to ground level ozone and smog levels is very insignificant. The project was found to have no significant health impacts in relation to its emissions. Moreover, the HRPP project can be expected to have a longer-term positive impact on human health due to its use of a carbon neutral hydrogen fuel.

Appendix A - ORTECH Consulting Inc. - Cooling Tower Icing Study

Report No. | 92460

ORTECH
a Kontrol Technologies Company

Report:

Eastern Power Inc.
Hydrogen Ready Power Project
Courtright, Ontario
Icing Study of Proposed 9-Cell Cooling Tower

Date: November 16, 2021



Report:

Eastern Power Inc.
Hydrogen Ready Power Project
Courtright, Ontario
Icing Study of Proposed 9-Cell Cooling Tower

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17 pages, 3 Appendices

Revision History

Version	Date	Summary Changes/Purpose of Revision
1	November 16, 2021	None

Table of Contents

EXECUTIVE SUMMARY

ORTECH Consulting Inc. (ORTECH) was retained to perform an icing study for a proposed 9-cell cooling tower which is planned to support operations of proposed Hydro Ready Power Plant (HRPP), a 600 MW combined cycle power plant in Courtright, Ontario. HRPP is proposed to be located on the same property, approximately 100 meters south, as the Green Electron Power Plant (GEPP) which is an existing 300 MW power plant. GEPP operations are supported by a 5-cell cooling tower. The purpose of this study is to analyze the potential of icing events due to water vapour deposition and drift deposition on nearby public roads, as identified below:

- Highway 40 (H40)
- Oil Springs Line (OSL)
- Greenfield Road (GFR) and
- Bickford Line (BFL)

For the purpose of this study, ORTECH utilized two different modelling software – AERMOD 19191 and SACTI2. AERMOD 19191 is US EPA model, current adopted by Ontario Ministry of Environment, Conservation and Parks (MECP) as a regulatory air dispersion model. SACTI2 is a computerized methodology, provided by Electric Power Research Institute (EPRI), for prediction of long-term physical impacts of natural- and mechanical draft cooling towers on a seasonal or annual basis. Both models are data intensive and require hourly meteorological parameters for a minimum period of one year, in addition to physical information of cooling towers, to predict annual icing events.

Individual icing potential of both the existing 5-cell and proposed 9-cell cooling tower was studied in addition to the combined icing potential of both cooling towers operating simultaneously. Generally, time periods of at least three hours are required to build up any significant icing[1,2,3]. AERMOD predicts hourly water vapour concentration at a location for each hourly input meteorological data. Hence, the outcome of AERMOD model could be further analyzed to identify potential icing events of three or more consecutive hours. SACTI2 model can only predict total hourly icing events at a particular location and hence potential icing events of three or more consecutive hours could not be identified from the SACTI2 model output.

AERMOD predicted a maximum of 14 individual hours per year where the ambient temperature will be at or below 0°C and where the vapour plume from HRPP cooling tower is expected to impinge on the surface of Highway 40. For same ambient conditions, SACTI2 predicted a maximum of 5 individual hours per year of plume impingement from HRPP cooling tower on Highway 40. AERMOD predicted a maximum of 1 event of three or more consecutive hours of potential icing at any local road in a year. Both, AERMOD and SACTI2 predict potential icing for less than 1% of time in a year.

[1] R.A. Stuart & G.A. Isaac (1999) Freezing precipitation in Canada, Atmosphere-Ocean, 37:1, 87-102, DOI: 10.1080/07055900.1999.9649622

[2] Petra Thorsson, Modelling of Atmospheric Icing – An Introduction Essay

[3] P. Complin and A. Murdock (2012), Cooling Tower Icing Study for the Green Electron Power Project (East Site), ORTECH Environmental

Due to proximity of HRPP and GEPP, their water vapour plumes from the respective cooling towers may merge, resulting in higher frequency of water vapour plume impingement on local roads. AERMOD predicted a maximum of 23 individual hours per year where the ambient temperature will be at or below 0°C and where the vapour plume is expected to impinge on the surface of Highway 40, from simultaneous operations of existing and proposed cooling towers at 100% capacity. For the same ambient conditions, SACTI2 predicted a maximum of 10 individual hours per year of plume impingement on Highway 40, from simultaneous operations of existing and proposed cooling towers at 100% capacity. In either case, the potential of individual hours of icing events are expected to be approximately 1% of time in a year and hence the potential icing events due to combined operations of existing and proposed cooling towers can be considered negligible.

On an average, Ontario experiences 50 annual hours of natural freezing precipitation events[1]. AERMOD predicted an annual average of 2 events of three or more consecutive hours of potential icing at any local road, based on a 5-year meteorological dataset, which is approximately 9 hours of potential icing, representing less than 18% of the natural icing hours per year outside of natural events of freezing. Due to inherent conservative assumptions in this study, such as year-round simultaneous operations of both cooling towers at 100% capacity and steady state advection of 100% saturated water vapour plume i.e., no loss of water content until plume impinges on roads, the predicted impact of cooling towers is also considered conservative and hence, significant adverse impacts on local roads are not expected from combined operations of cooling towers.

1 R.A. Stuart & G.A. Isaac (1999) Freezing precipitation in Canada, Atmosphere-Ocean, 37:1, 87-102, DOI: 10.1080/07055900.1999.9649622

1. INTRODUCTION

1.1 Description of Site

HRPP is proposed to be located approximately 100 meters south of GEPP on same property, at 477 Oil Springs Line Courtright, Ontario (Site). Highway 40 and Oil Springs Line are two major arterial roads which are on east side and north side of the Site, respectively. Greenfield Road and Bickford Line are two local roads on west side and south side of the Site, respectively. Land use around the Site is mainly composed of agricultural use and forest cover. Appendix B shows the location of the Site and surrounding features, along with general Site arrangement featuring the locations of cooling towers, buildings and other power plant equipment.

1.2 Cooling Towers

Specifications of both, proposed and existing cooling towers are provided in Table 1 below. The physical dimensions of cooling tower assembly are shown in Appendix A. GEPP generally operates only on non-holiday weekdays during hours of peak and intermediate peak demand i.e., 7 AM to 11 PM. Proposed HRPP is expected to operate on same schedule.

Table 1: Specifications of Proposed and Existing Cooling Towers

Parameter	Proposed - HRPP	Existing - GEPP
Number of cells	9	5
Heat Rejection Capacity (MMBTU/hr)	1,460	730
Air Flowrate per Fan (CFM)	1,099,838	1,099,838
Total Circulating Water Flowrate (US GPM)	200,000	100,000

2. FOGGING AND ICING

Air entering a cooling tower has ambient levels of water vapor, however, when the air exits from a cooling tower, it is very near or at saturation. As air exits the cooling tower and mixes with the surrounding air, the exhaust air cools rapidly and can no longer carry the water vapor it held inside the tower. Certain wind flow conditions can cause the water vapour plume from cooling tower to be drawn to the ground by the aerodynamic effects of air flowing over the cooling tower structures. These ground level plumes can cause fogging which could impact driving conditions on roadways. Fogging is likely to occur when air is cooled to or below its dew point temperature and/or enough moisture is added to the air within a water vapour plume to reach or exceed the point of saturation. Icing can occur when fogging occurs and air is below the freezing temperatures (32°F or 0°C) and the plume touches down on a solid surface that is also below 0°C. This so called 'rime' icing has been observed from mechanical-draft cooling towers, as has another form of icing that has been documented when water droplets are entrained in the exhaust air ('drift droplets') impact on the ground and freeze.

Literature suggests that significant icing occurs when water vapour plume impinges on a freezing surface for extended duration[1,2,3]. A study[1] compiling historical freezing precipitation events in Canada describes an "event" to be a sequence of consecutive hours of freezing rain/drizzle/precipitation. It was identified in the study[1] that Ontario experience approximately 50 hours of such events. The modelling outcome in this report was re-arranged to identify the subsequent hours of icing potential (or events).

3. AERMOD MODELLING

US EPA AERMOD model (version 19191) is the current regulatory dispersion model in Ontario, as adopted by the Ministry of Environment, Conservation and Parks (MECP). AERMOD requires data inputs such as emission intensity (grams/unit time) for an emission source (example roads, rail lines, stacks, etc.) and meteorological data (wind speed, temperature, etc.) to calculate the dispersion of exhaust streams towards receptor points (residence, schools, etc.). AERMOD input requirements are discussed below in detail.

3.1 Physical Characterization of Cooling Tower Cells

The cells of cooling towers were represented by point sources in AERMOD model. The physical exhaust parameters of each cell are provided below in Table 2.

Table 2: Exhaust Parameters of Cooling Towers

Parameter (each cell)	Proposed - HRPP	Existing - GEPP
Exhaust Diameter (meters)	10	10.4
Exhaust Height (meters)	11.9	11.5
Exhaust Temperature (°K)	305.37	305.37
Exhaust Flowrate (m^3/s)	519	519

3.2 Emission Rates

Water losses or emissions to atmosphere from cooling towers occur primarily in two forms – evaporation losses and drift losses, as identified in Section 2 of this report. Evaporation losses depends on the capacity of cooling tower to bring down the temperature of circulating water.

By using a heat transfer equation, the total heat load of a cooling tower is given by

Heat Load (BTU/hr) = Cooling water mass in lbs/hr x specific heat of water Btu/lb-°F x temperature differential of circulating water

[1] R.A. Stuart & G.A. Isaac (1999) Freezing precipitation in Canada, Atmosphere-Ocean, 37:1, 87-102, DOI: 10.1080/07055900.1999.9649622

[2] Petra Thorsson, Modelling of Atmospheric Icing – An Introduction Essay

[3] P. Complin and A. Murdock (2012), Cooling Tower Icing Study for the Green Electron Power Project (East Site), ORTECH Environmental

For proposed cooling tower,

Heat load = 1460 x 10^6 BTU/hr
Circulating water flowrate = 200,000 GPM
By using a water density of 1 kg/liter, circulating water mass flowrate = 99.934 x 10^6 lb/hr
Specific heat of water = 1 Btu/lb-°F

Hence, from above heat load equation, the temperature differential of circulating water is estimated to be 14.6°F. The temperature of circulating water at cooling tower outlet is 32°C or 90°F. Hence, the inlet temperature of circulating water based on estimated temperature differential is 104.6°F or 40°C. Therefore, the proposed cooling tower has a capacity to reduce circulating water temperature by approximately 8°C.

Evaporation losses can be estimated using the equation below:

Evaporation losses = circulating water flow rate x temperature differential of circulating water x specific heat of water/latent heat of vaporization of water

= 200000 GPM x 8°C x 1 kcal/kg / °C x 540 kcal/kg
= 186.93 liters/second or kg/second

Similarly, the evaporation loss from existing cooling tower was estimated to be 93.47 kg/second.

Similar to existing cooling tower, the proposed cooling tower is expected to be equipped with a drift eliminator. Typically, the emissions from a cooling tower equipped with drift eliminator are in the range of 0.0005 to 0.001 percent or less of circulating water.

Drift loss from proposed cooling tower = 0.001% of 200,000 GPM = 0.126 liters/second or kg/second

Similarly, drift losses from existing cooling tower were estimated to be 0.063 kg/second. Therefore, combined vapour and drift losses from proposed cooling tower are 187.06 kg/second and from existing cooling tower are 93.533 kg/second.

From each cell of proposed cooling tower,

Water emission rate = 187.06 kg/second/9 cells = 20,800 g/s (approximately)

Similarly, water emission rate from each cell of existing cooling tower is 18,700 g/s.

3.3 Variable Emissions

Since the load on the cooling tower varies with ambient conditions, emission factors were selected to represent winter, spring and fall for both the vapour and drift models to account for the seasonally reduced water emission rates and air flow. A factor of 0.8 was applied for winter, while a factor of 0.9 was applied for the spring and fall. In summer, the load on cooling towers is assumed to be maximum and hence an emission factor of 1 was used for summer season.

3.4 Meteorological Data

MECP provides generic zonal meteorological data readily usable by AERMOD. This generic data represents typical meteorological conditions observed within zonal boundaries. For the Site, MECP's generic meteorological data is provided for the London region. For simulating site-specific meteorological conditions and land use characteristics at the Site, MECP's generic data may not be ideal. Hence, ORTECH developed site-specific meteorological data by using raw surface meteorological data from Environment and Climate Change Canada weather station at Sarnia Airport (ID: 6127510) for a period of 5 years (2016 to 2020). This raw data was further processed in accordance with MECP's guidelines presented in Section 6.3.1 in Air Dispersion Modelling Guideline for Ontario (ADMGO), prior to running AERMET pre-processor.

Upper air data for calendar years 2016 to 2020 was downloaded for radiosonde station at Detroit, USA from NOAA/ESRL Radiosonde Database. The data format provided by NOAA/ESRL Radiosonde Database is readily acceptable by AERMET, so no further processing of upper air data was done. Based on google images, land cover data for the Site was estimated and the land within 3 km of the Site was divided into four sectors as follows:

- Sector 0 to 90 degrees – 30% forest cover and 70% agricultural land
- Sector 90 to 180 degrees – 50% forest cover and 50% agricultural land
- Sector 180 to 270 degrees – 40% forest cover and 60% agricultural land
- Sector 270 to 360 degrees – 30% forest cover and 70% agricultural land

The land use characteristics of these sectors were defined by using seasonal values of parameters such as surface roughness length, albedo and bowen ratio provided by MECP through their website. Finally, AERMET 19191 pre-processor was run with all the input data explained above i.e., surface meteorological data, upper air data and land use data, to generate AERMOD ready site-specific meteorological data files called Surface File (.sfc) and Profile File (.pfl).

3.5 Receptors

The icing potential was assessed at receptors along Oil Springs Line, Highway 40, Greenfield Road and Bickford Line. Within the AERMOD model, discrete receptors were spaced along these transportation routes at 10-meter intervals, within approximately 2 km radius of the Site, as shown by Appendix B.

3.6 Terrain Data

MECP's NED GeoTIFF file "cdem_dem_040J.tif" was used as digital terrain input to the AERMAP. The US EPA recommended elevation data import technique was used to import the elevations for receptors, sources and buildings.

3.7 Drift Droplet Size Distribution

The droplet size distribution spectrum (see Appendix A) of the drift particles from the cooling tower is provided in Table 3. The density of the drift droplets selected was 1 g/cm^3 (essentially water at standard temperature and pressure).

Table 3: Drift Droplet Size Distribution

Size (microns)	Mass Flux (µg/m^2/s)	Size Fraction
10	0.00E+00	0.00E+00
20	6.98E+00	2.45E-04
30	1.48E+00	5.19E-05
40	4.40E+00	1.54E-04
50	1.47E+01	5.16E-04
60	5.62E+01	1.97E-03
70	1.18E+03	4.14E-02
90	1.64E+03	5.75E-02
110	2.22E+03	7.79E-02
130	2.50E+03	8.77E-02
150	2.46E+03	8.63E-02
180	2.15E+03	7.54E-02
210	2.07E+03	7.26E-02
240	2.59E+03	9.08E-02
270	2.78E+03	9.75E-02
300	4.56E+03	1.60E-01
350	1.41E+03	4.94E-02
400	2.26E+03	7.93E-02
450	4.61E+02	1.62E-02
500	1.50E+02	5.26E-03

3.8 Vapour Touchdown and Drift Deposition

Icing potential at freezing temperatures was determined by comparing the moisture deficit to reach saturation (i.e., the difference between the actual relative humidity and 100% humidity) in the atmosphere and the dispersed water vapour concentration from the cooling towers at the specific receptors. The 'dry deposition algorithm' (i.e., the model section that looks at particle fallout (termed 'dry') as opposed to the model section that looks at particle washout due to precipitation (termed 'wet') of AERMOD was used to predict the deposition of the drift droplets, as an indicator to look for the other form of icing potential.

The saturated vapor pressure of water was calculated using a formula by Wexler:

$$\ln e_{sat} = \sum_{i-0}^{6} g_i T^{i-2} + g_7 \ln T$$

Where: e_{sat} is the saturated vapor pressure of water (Pa);
T is the temperature (K)
g0 = -2.99×10^{3}
g1 = -6.02×10^{3}
g2 = 1.89×10^{1}
g3 = -2.84×10^{-2}
g4 = 1.78×10^{-5}
g5 = -8.42×10^{-10}
g6 = 4.44×10^{-13}
g7 = 2.86×10^{0}

Using the ideal gas law, the saturated water vapor density in the atmosphere can be calculated as:

$$SVD = \frac{e_{sat}}{RT}$$

Where: SVD is the saturated water vapor density (kg/m^3)
R is the water vapor constant (461.5 J/kg*K)
T is the ambient temperature

Based on the recorded humidity, the actual water vapor density in the atmosphere is calculated as:

$$AVD = SVD \times \frac{RH}{100}$$

Where: AVD is the actual water vapor density (kg/m^3)
RH is the relative Humidity (%)

The water vapor deficit (VDD) in the atmosphere is calculated by:

$$VDD = SVD - AVD$$

VDD values for each hourly meteorological condition from 2016 to 2020 were calculated and a copy of these calculations is provided in Appendix C. Minimum VDD estimated from above calculations is 0.028 kg/m^3. If the predicted hourly water vapor concentrations calculated by AERMOD were greater than the VDD at a specific receptor, that hour was considered to have a potential icing event when the temperature is at or below the freezing point.

In order to indicate the drift droplet fallout impinging on the ground and causing icing, 1/10th of the minimum reportable precipitation amount by the ECCC, i.e., 0.01 mm, was used to gauge the fallout. The equivalent deposition of the precipitation (DoP) can be calculated as:

$$DoP = 0.01(mm) \times 1.0(g/cm^3) = 1E^{-5}(m) \times 1E^{6}(g/m^3) = 10\ g/m^2$$

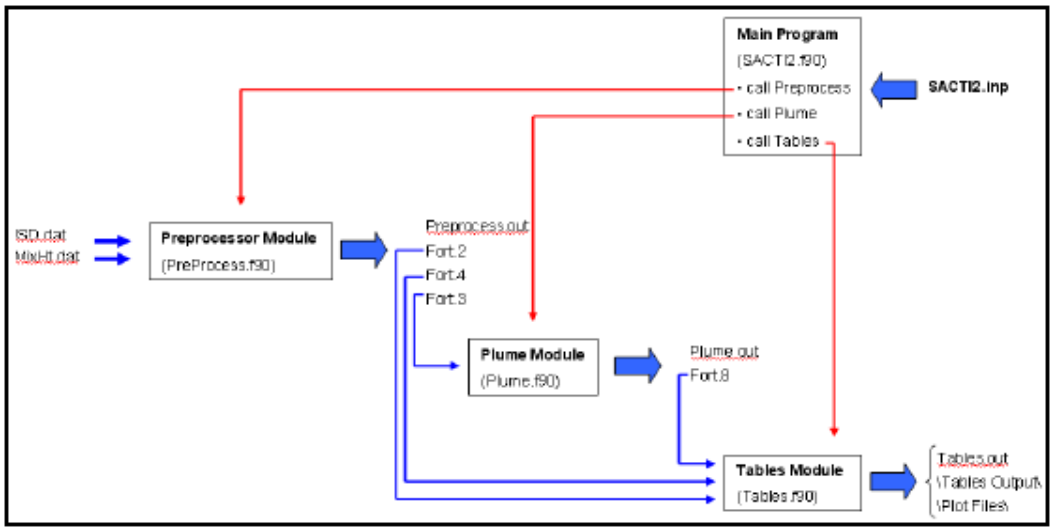
Therefore, the "dry deposition" predicted by AERMOD for drift droplet fallout at 10 g/m^2 or above on those "dry hours" was considered to have icing potential on the ground.

4. SACTI2 MODELLING

Seasonal/Annual Cooling Tower Impact (SACTI) model was developed by Argonne National Laboratory/University of Illinois with support from the Electric Power Research Institute (EPRI). SACTI Version 2.0 or SACTI2 is a computerized methodology for the prediction of long-term physical impacts of natural- and mechanical draft cooling towers on a seasonal or annual basis, available from EPRI website. Similar to AERMOD, SACTI2 requires meteorological data to characterize surface and upper air conditions, physical characterization of sources and land use conditions.

SACTI2 has three separate modules – Preprocessor module, Plume module and Tables module. The preprocessor module processes raw meteorological data and generates an hourly surface meteorological data file and twice daily mixing height data file. Figure 1 shows the schematic of SACTI2 modules.

Figure 1: Schematics of SACTI2 Modules



* Image copied from SACTI2 User Guide

As suggested in SACTI2 user guide, the raw surface meteorological data was downloaded in Integrated Surface Database (ISD) format from the NOAA website. The surface data was downloaded for NWS station 717040 (Sarnia), for calendar years 2016 to 2020. A customized version of AERMET (included in SACTI2 executables package) was run to convert raw meteorological data into hourly surface meteorological data file (.OQA) which is usable by main SCATI2 program.

The preprocessor module of SACTI2 requires upper air data to generate twice daily mixing height data file (.out). Upper air data for calendar years 2016 to 2020 was downloaded for radiosonde station at Detroit, USA from NOAA/ESRL Radiosonde Database.

Following these steps, SACTI2 main program executable (SACTI2.exe) was run with the hourly surface meteorological data file, twice daily mixing height data file and main program input file (.inp). Copies of SATI2 input files are provided in Appendix C. The Plume module and the Tables module are subroutines of main program, which run automatically within main program. The Plume module performs plume and drift predictions, and Table module tabulates the results and generate plot files.

5. RESULTS AND ANALYSIS

5.1 AERMOD Results and Analysis

The threshold violation file generated by AERMOD, based on minimum VDD of 0.028 kg/m^3, was further analyzed to quantify the hours of icing potential. The AERMOD results are presented in Tables 4 to 6. Two events of three or more consecutive hours with icing potential were observed, due to combined impact of existing and proposed cooling towers. These events were predicted at Highway 40 and Oil Springs Line. No such events were predicted at Greenfield Road and Bickford Line. The drift fallout was predicted to be below 10 g/m^2 at any nearby arterial roads.

Table 4: AERMOD Predicted Icing Events – Proposed 9-Cell Cooling Tower

Receptors		Annual Number of Potential Icing Events Likely Caused by Saturated Plume from Proposed Cooling Tower			
		Individual Hours	Consecutive 3 Hours or More	Consecutive 5 Hours or More	Consecutive 10 Hours or More
Arterial Roads	Oil Springs Line	10	1	<1	0
	Highway 40	14	1	<1	0
Local Roads	Bickford Line	<1	0	0	0
	Greenfield Road	7	<1	0	0

Table 5: AERMOD Predicted Icing Events – Existing 5-Cell Cooling Tower

Receptors		Annual Number of Potential Icing Events Likely Caused by Saturated Plume from Existing Cooling Tower			
		Individual Hours	Consecutive 3 Hours or More	Consecutive 5 Hours or More	Consecutive 10 Hours or More
Arterial Roads	Oil Springs Line	1	0	0	0
	Highway 40	<1	0	0	0
Local Roads	Bickford Line	0	0	0	0
	Greenfield Road	<1	0	0	0

Table 6: AERMOD Predicted Icing Events – Proposed and Existing Cooling Towers (Combined)

Receptors		Annual Number of Potential Icing Events Likely Caused by Saturated Plume from both Existing and Proposed Cooling Towers			
		Individual Hours	Consecutive 3 Hours or More	Consecutive 5 Hours or More	Consecutive 10 Hours or More
Arterial Roads	Oil Springs Line	18	2	<1	0
	Highway 40	23	2	<1	0
Local Roads	Bickford Line	2	<1	0	0
	Greenfield Road	10	<1	0	0

5.2 SACTI2 Results and Analysis

Tables generated by SACTI2 indicate that 10 hours of potential icing events may occur at Highway 40, due to combined impact of vapour emissions from existing and proposed cooling towers. Only one hour of icing potential was predicted on Oil Springs Line and no icing events were predicted on Greenfield Road and Bickford Line. Table 7 to 8 shows the results of SACTI2 modelling.

Table 7: SACTI2 Predicted Icing Events – Proposed 9-Cell Cooling Tower

Receptors		Annual Number of Potential Icing Events Likely Caused by Saturated Plume from Proposed Cooling Tower
		Individual Hours
Arterial Roads	Oil Springs Line	0
	Highway 40	5
Local Roads	Bickford Line	0
	Greenfield Road	0

Table 8: SACTI2 Predicted Icing Events – Existing 5-Cell Cooling Tower

Receptors		Annual Number of Potential Icing Events Likely Caused by Saturated Plume from Existing Cooling Tower
		Individual Hours
Arterial Roads	Oil Springs Line	0
	Highway 40	5
Local Roads	Bickford Line	0
	Greenfield Road	0

Table 9: SACTI2 Predicted Icing Events – Proposed and Existing Cooling Towers (Combined)

Receptors		Annual Number of Potential Icing Events Likely Caused by Saturated Plume from both Existing and Proposed Cooling Towers
		Individual Hours
Arterial Roads	Oil Springs Line	1
	Highway 40	10
Local Roads	Bickford Line	0
	Greenfield Road	0

6. CONCLUSIONS AND RECOMMENDATIONS

A modelling study was conducted to quantify potential icing events due to combined operations of a 5-cell cooling tower at the existing GEPP and a 9-cell cooling tower at the proposed HRPP and their impact in on nearby public roads. For this purpose, AERMOD 19191 and SACTI2 models were used.

AERMOD predicted a maximum of 14 individual hours per year where the ambient temperature will be at or below 0°C and where the vapour plume from HRPP cooling tower is expected to impinge on the surface of Highway 40. For same ambient conditions, SACTI2 predicted a maximum of 5 individual hours per year of plume impingement from HRPP cooling tower on Highway 40. AERMOD predicted a maximum of 1 event of three or more consecutive hours of potential icing at any local road in a year. Both, AERMOD and SACTI2 predict potential icing for less than 1% of time in a year.

Due to proximity of HRPP and GEPP, water vapour plumes from the respective cooling towers may merge, resulting in higher frequency of water vapour plume impingement on local roads. AERMOD predicted a maximum of 23 individual hours per year where the ambient temperature will be at or below 0°C and where the vapour plume is expected to impinge on the surface of Highway 40, from simultaneous operations of existing and proposed cooling towers at 100% capacity. For same ambient conditions, SACTI2 predicted a maximum of 10 individual hours per year of plume impingement on Highway 40, from simultaneous operations of existing and proposed cooling towers at 100% capacity. In either case, the potential of individual hours of icing events are expected to be approximately 1% of time in a year and hence the potential icing events due to combined operations of existing and proposed cooling towers can be considered negligible.

On an average, Ontario experiences 50 annual hours of natural freezing precipitation events[1]. AERMOD predicted an annual average of 2 events of three or more consecutive hours of potential icing at any local road, based on a 5-year meteorological dataset, which is approximately 9 hours of potential icing, representing less than 18% of the natural icing hours per year outside of natural events of freezing. Due to inherent conservative assumptions in this study, such as year-round simultaneous operations of both cooling towers at 100% capacity and steady state advection of 100% saturated water vapour plume i.e., no loss of water content until plume impinges on roads, the predicted impact of cooling towers is also considered conservative and hence, significant adverse impacts on local roads are not expected from combined operations of cooling towers.

1 R.A. Stuart & G.A. Isaac (1999) Freezing precipitation in Canada, Atmosphere-Ocean, 37:1, 87-102, DOI: 10.1080/07055900.1999.9649622

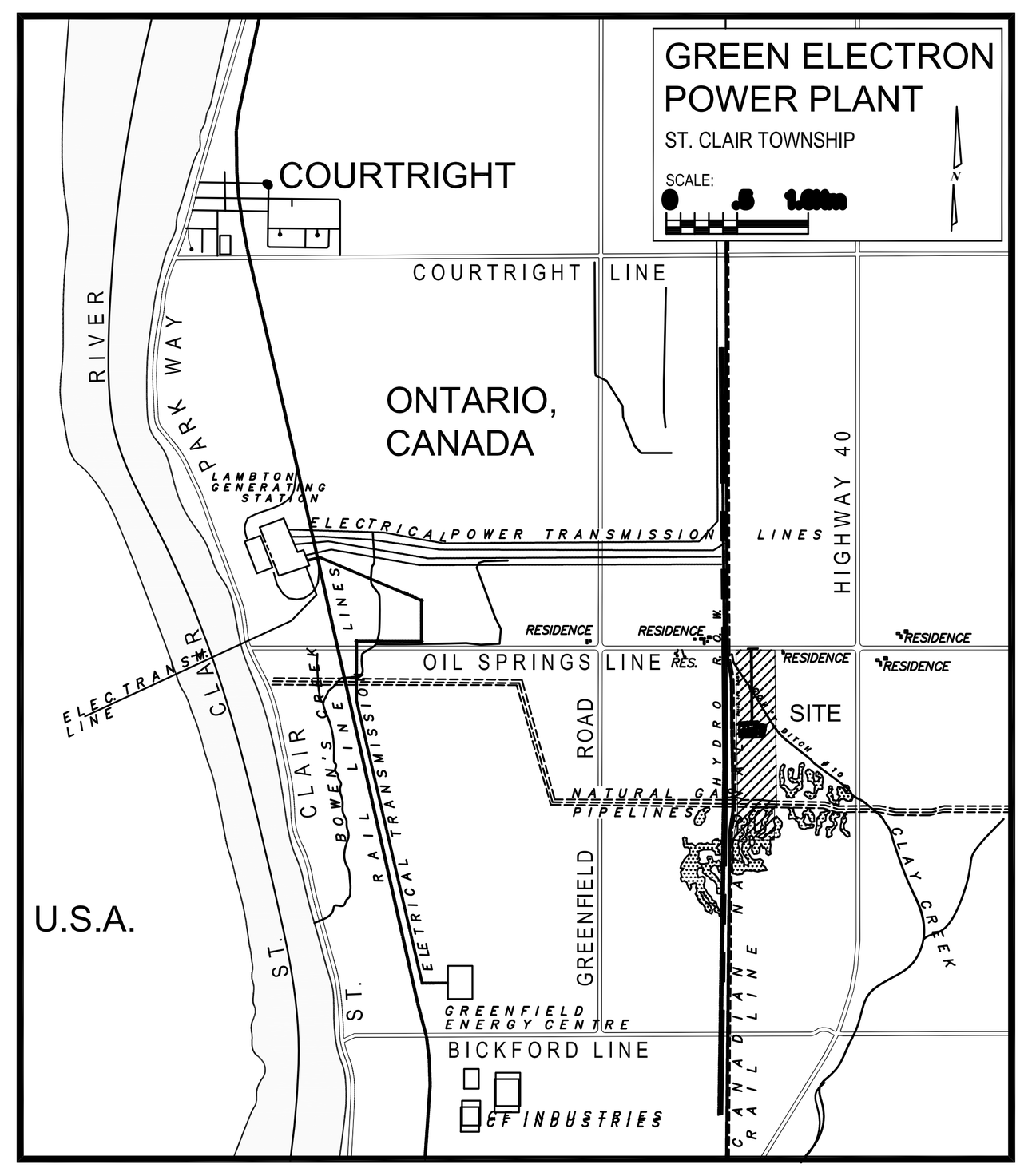
7. LIMITATIONS

The assessment, conclusion and recommendations in this report are based on the information provided by Eastern Power, documented technical guidance from regulatory bodies such as MECP, US EPA and EPRI available in public domain and ORTECH's profession opinion. This report is prepared for exclusive use of Eastern Power, their representatives and stakeholders of development. The assessment presented in this report is not applicable to other sites. Any changes to the site plan may require revision of this assessment.

The model versions, input data and technical guidance used for this assessment is current to best of ORTECH's knowledge, at the time of preparation of this report. However, these tools and guidance are dynamic in nature and are updated by relevant authorities in light of latest scientific research. ORTECH does not accept any responsibility for future changes in dispersion model versions, input data requirements and technical guidance. The conclusions presented in this assessment are based, in part, upon computer modelling predictions and actual measured impacts at receptor locations may differ from these predicted values.

APPENDIX A

General Site Plan, Layouts and Cooling Tower Information
(4 pages)



ZONE : INDUSTRIAL TYPE 3 M3 Sec 10.3

SITE PLAN & BUILDING STATISTICS

ZONE : INDUSTRIAL TYPE 3 M3 Sec 10.3

	REQUIREMENTS	EXISTING	PROPOSED (FINAL)
LOT AREA	40 ha (or existing–Sec. 4.10 a)	36.5ha [90.2 Acres]	36.5ha [90.2 Acres]
MIN. LOT FRONTAGE	45m [147.64']	273.37m [896.88']	273.37m [896.88']
MIN. FRONT YARD DEPTH	153m [501.96']	----------	525.20m [1723.00']
MIN. REAR YARD DEPTH	153m [501.96']	----------	732.5m [2403.20']
MIN. SIDE YARD – WEST SIDE	30.00m [98.43']	----------	30.5m [100.06']
MIN. SIDE YARD – EAST SIDE	50.0m [164.04'] (Minor Variance)	----------	76.5m [250.98']
MAX HEIGHT	38.0m [124.70'] (Minor Variance)	----------	37.5m [123.00]
BUILDING FOOTPRINT AREA			
MAIN POWER HOUSE	–	–	2,599.94m² [27,985.52 SQ.FT.]
PARTS STORAGE/COMP. BLDG.	–	–	371.32m² [3,996.85 SQ.FT.]
PUMP HOUSE	–	–	208.87m² [2,208.25 SQ.FT.]
COOLING TOWER	–	–	944.11m² [10,162.30 SQ.FT.]
DEMIN WATER TANK	–	–	71.62m² [771.00 SQ.FT.]
P&C ENCLOSURE	–	–	52.00m² [560.00 SQ.FT.]
HRSG & STACK	–	–	N/A
TOTAL (COVERAGE)	–	–	4,247.86m² [45,723.58 SQ.FT.]
MAX. LOT COVERAGE %	50	–	1.16
PROPOSED MANAGEMENT & ENGINEERING BUILDING	–	–	214.0m² [2303.47 SQ.FT']
NEW LOT COVERAGE %	50 (MAX)	–	1.22
POWER HOUSE GROSS FLOOR AREA (including all buildings,cooloing tower & levels 2, 3 & Op.)		–	5,479.48m² [58,980.63 SQ.FT.]
PARKING	ONE PER STAFF (12±)	–	35 +
LOADING BAY	ONE NEEDED	–	3 PROVIDED

NOTE:

THIS DRAWING HAS BEEN REVISED TO SHOW 9 FANS INSTEAD OF 8 ON JUNE 9TH, 2021

BY CP

INFORMATION ON THIS SITE PLAN taken from:

Surveyor's Real Property Report

PLAN OF SURVEY OF

PART OF LOT 26, CONCESSION 2
AND PART OF THE ROAD ALLOWANCE
BETWEEN CONCESSION 1 & 2

GEOGRAPHIC TOWNSHIP OF MOORE

AND PART OF LOT 26,
REGISTERED PLAN 24 (MO)
TOWNSHIP OF ST. CLAIR
COUNTY OF LAMBTON

METRES 0 20.00 40.00 80.00 120.00 200.00

SCALE = 1:1500

Bearing Reference:

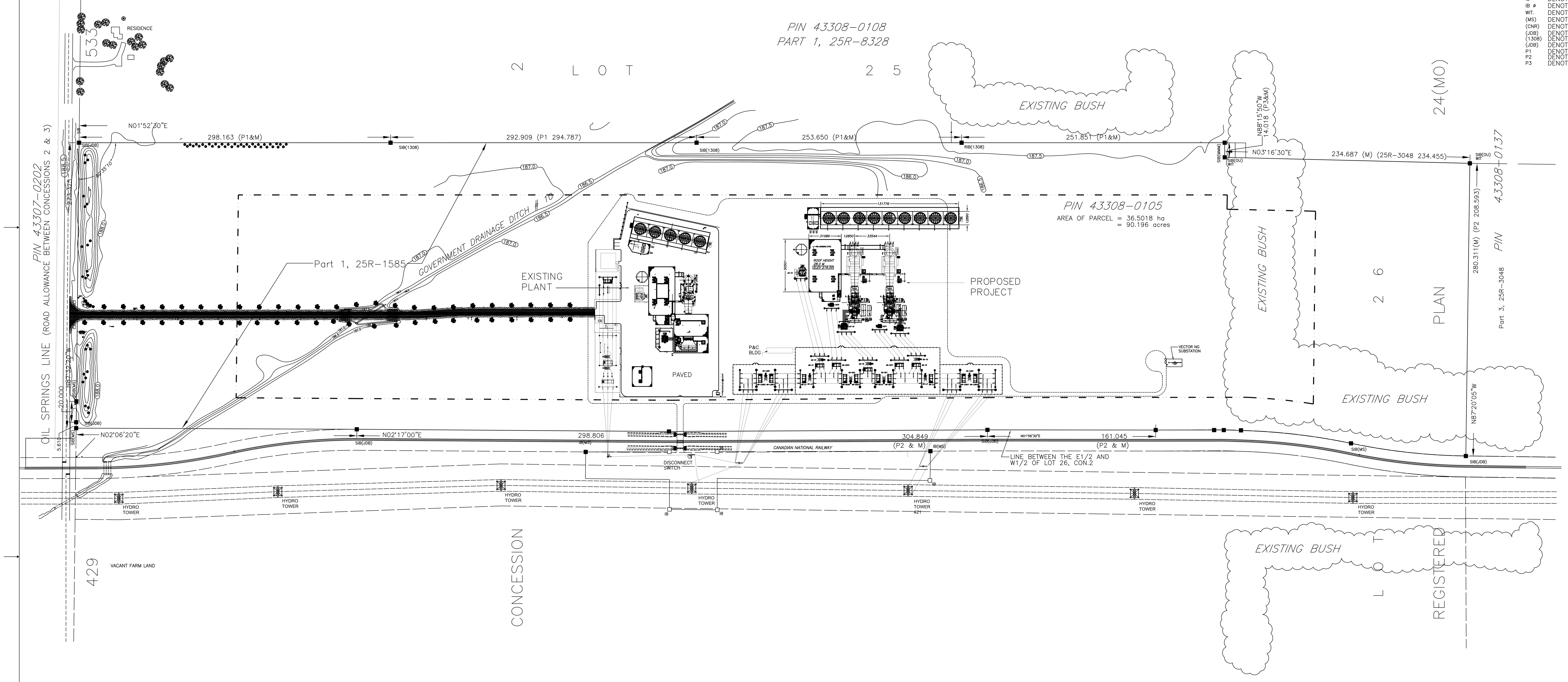
BEARINGS SHOWN HEREON ARE GRID BEARINGS AND ARE DERIVED BY GLOBAL POSITIONING SYSTEM (G.P.S.) USING MINISTRY OF NATURAL RESOURCES MONUMENT Nos. 01019840301 (N 4752125.900, E 381170.467) AND 01019840304 (N 4750756.014, E 384554.253)
BASED ON THE ONTARIO 6° BEING IN ZONE 17 AND HAVING A CENTRAL MERIDIAN OF 81° WEST. DISTANCE SHOWN ON THIS PLAN ARE ADJUSTED GROUND LEVEL DISTANCES AND CAN BE USED TO COMPUTE GRID LEVEL DISTANCES BY MULTIPLYING BY COMBINED SCALE FACTOR OF 0.99973919.

Notes:

■ DENOTES SURVEY MONUMENT FOUND
□ DENOTES SURVEY MONUMENT SET AND MARKED MS
SIB DENOTES 25mm X 25mm X 1.22m STANDARD IRON BAR
SSIB DENOTES 25mm X 25mm X 0.61m SHORT STANDARD IRON BAR
IB DENOTES 16mm X 16mm X 0.61m IRON BAR
IB ø DENOTES 19mm diameter X 0.61m ROUND IRON BAR
WIT. DENOTES WITNESS
(MS) DENOTES MONTEITH & SUTHERLAND LTD., O.L.S.
(CNR) DENOTES CANADIAN NATIONAL RAILWAY
(JDB) DENOTES J.D. BARNES, O.L.S.
(1308) DENOTES R.W. ROBERTSON. O.L.S.
(JDB) DENOTES J.D. BARNES, O.L.S.
P1 DENOTES 25R–8328
P2 DENOTES 25R–8361
P3 DENOTES 25R–1585

Metric

Distances shown on this plan are in Metres and can be converted to feet by dividing by 0.3048



NOT FOR CONSTRUCTION

DEVELOPMENT APPLICATION NUMBERS	
DEVELOPMENT TYPE	INDUSTRIAL
LEGAL DESCRIPTION	Part Lot 26, Con 2E, Part Lot 26 & Part Road Allowance between Con 1&2 Plan 24RP 25R 1585; Parts 1 to 10 TOWNSHIP OF ST. CLAIR

No	DATE	REVISIONS/ISSUED	BY	CHK	APP
A	JUN 14/21	IN PROGRESS BY CIRO	CP	CP	

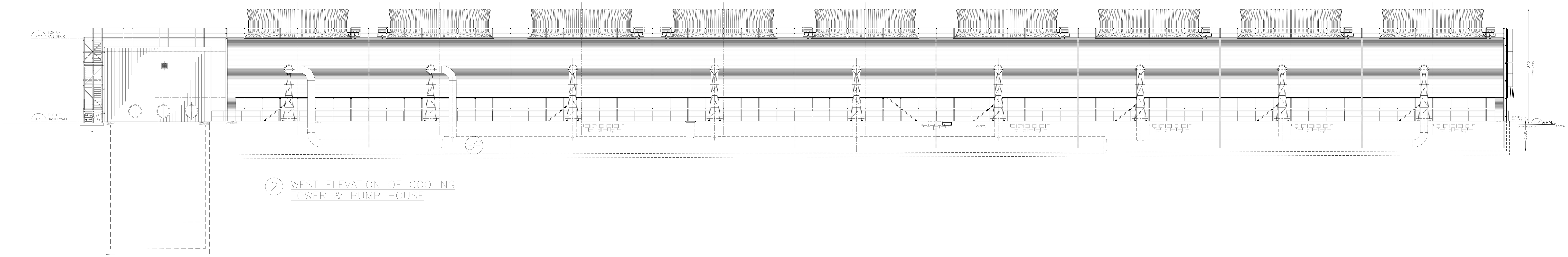
SECTION: ARCHITECTURAL		
SCALE: 1:1500	DATE	
DESIGNED: C. POLSINELLI	JUN 14/21	
DRAWN: C. POLSINELLI		
CHECKED:		
REVIEWED:		

CLIENT: EASTERN POWER LIMITED
2275 LAKESHORE BLVD. WEST
TORONTO, ONTARIO, M8V 3Y3
TEL: (416) 234-1301 FAX: (416) 234-8336

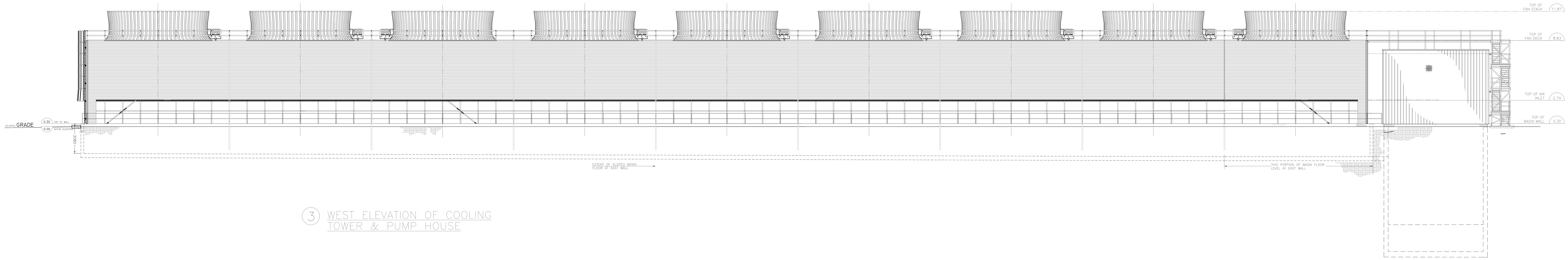
PROJECT: 477 GREEN ELECTRON–2
477 OIL SPRINGS LINE
TOWNSHIP OF ST. CLAIR

TITLE: GENERAL ARRANGEMENT
SITE PLAN
1:1500

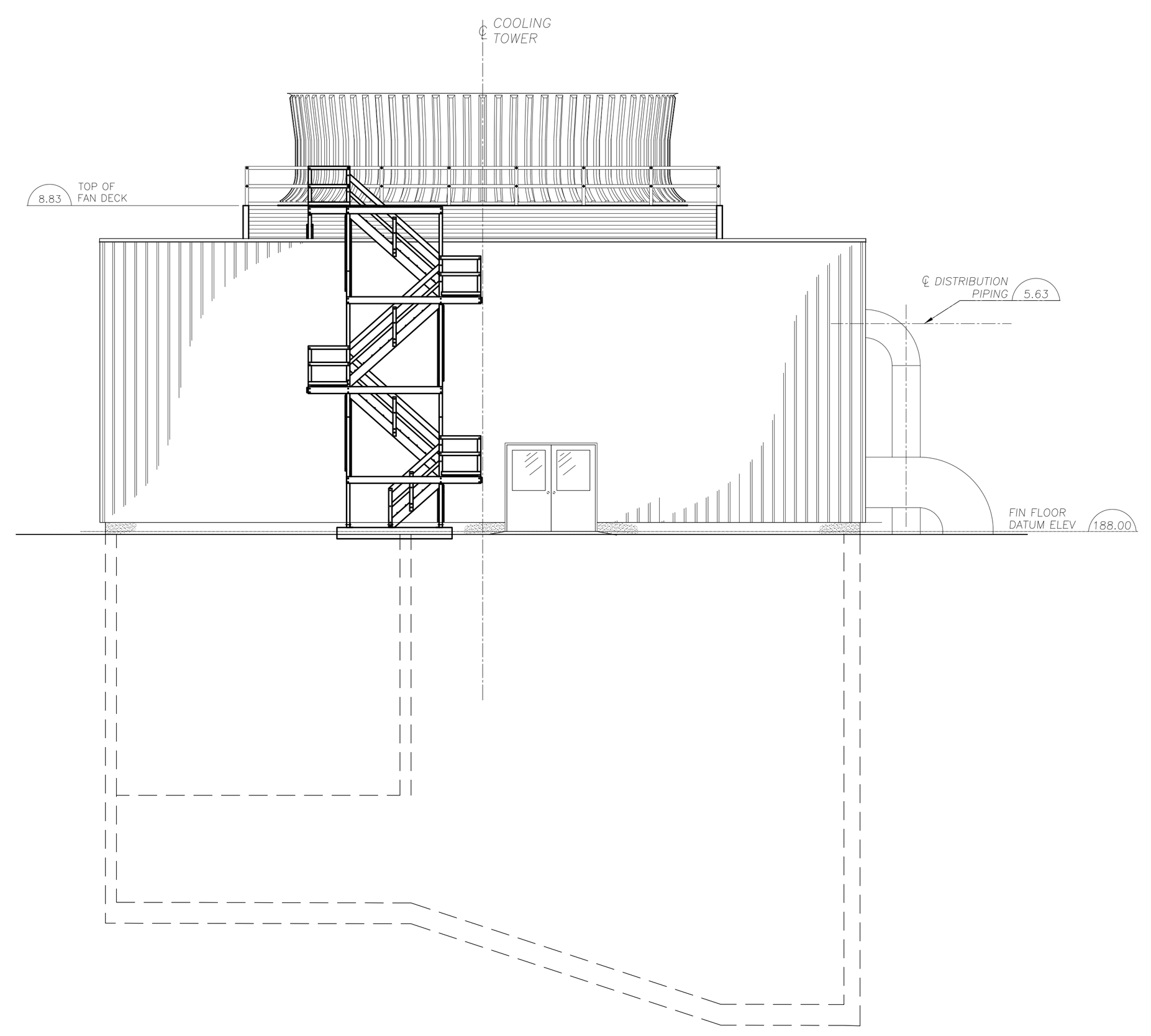
DRAWING CODE: 4|0|2|–|1|0|–|0|1|–|1|A REV D



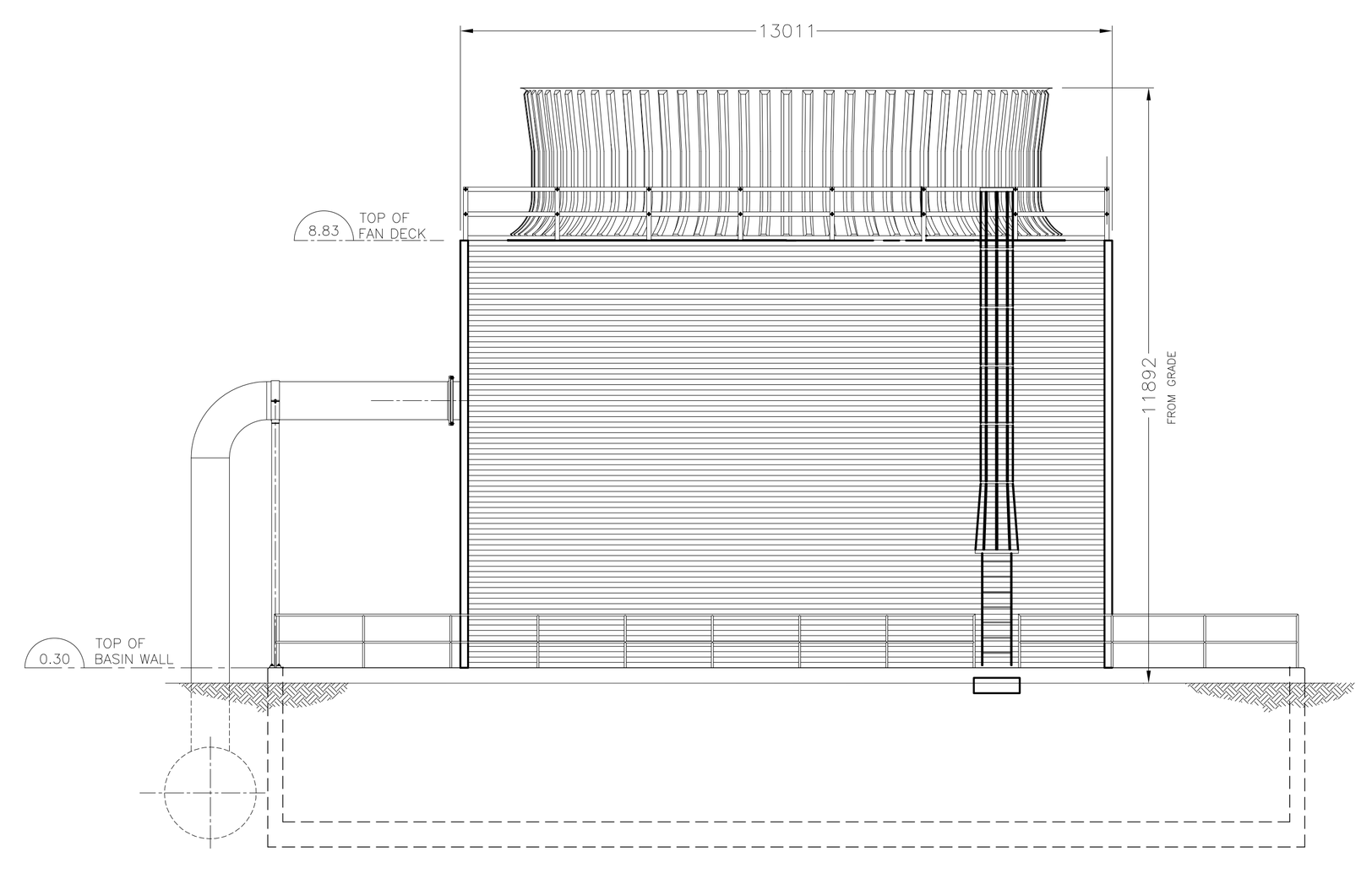
2 WEST ELEVATION OF COOLING TOWER & PUMP HOUSE



3 WEST ELEVATION OF COOLING TOWER & PUMP HOUSE



1 NORTH ELEVATION OF COOLING TOWER & PUMP HOUSE



4 SOUTH ELEVATION

DEVELOPMENT APPLICATION NUMBERS	
DEVELOPMENT TYPE	INDUSTRIAL
LEGAL DESCRIPTION	PART LOT 26, CONCESSION 2 E & PART ROAD ALLOWANCE BETWEEN CONCESSION 1 & 2, PLAN 24RP 25R 1585; PARTS 1 TO 10 TOWNSHIP OF ST. CLAIR

No	DATE	REVISIONS/ISSUED	BY	CHK	APP
A	JUN 15/21	GENERAL CONFIGURATION	CP	CP	

SECTION:	ARCHITECTURAL
SCALE:	1:150
DESIGNED:	C. POLSINELLI JUN 15/21
DRAWN:	C. POLSINELLI JUN 15/21
CHECKED:	
APPROVED:	

CLIENT: EASTERN POWER LIMITED
2275 LAKESHORE BLVD. WEST
TORONTO, ONTARIO, M8V 3Y3
TEL: (416) 234-1301 FAX: (416) 234-8336

PROJECT: GREEN ELECTRON POWER PLANT
477 OIL SPRINGS LINE
TOWNSHIP OF ST. CLAIR

TITLE: GENERAL ARRANGEMENT
COOLING TOWER
ELEVATIONS & SECTIONS

DRAWING CODE: 477-10-07 REV: A

\HOS\Data\477 Green Electron-2\General Arrangement Drawings\477-10-07 General Arrangement Cooling Tower Elevations & Sections Sheet 1.dwg, 6/17/2021 1:29:04 PM, Adobe PDF

Cooling Tower Design Information

Prepared By: HuaWu Liu

23-Sep-21 rev 0

	Unit	GEPP	Proposed HRPP
number of cell		5	9
number of fan		5	9
Design Total Heat Rejection	MMBTU/Hr	730	1,460
Design Air Input Flowrate per fan	ACFM/each fan	1,099,838	1,099,838
Design Total Air Input Flowrate for tower	ACFM	5,499,190	9,898,542
Design Total Circulating Water Flowrate	US GPM	100,000	200,000

ACCU-PAC
SURFACE MEDIA®

Brentwood CDX-020 Drift Eliminator Performance Test Results

Air Velocity =	2.955	m/sec	552.4	ft/min
Water loading =	19.02	m3/hr/m2	7.78	gpm/ft2

SUMMARY DROP SIZE DISTRIBUTION

AREA SAMPLED =	5.94	m2	64	ft2

File: CDX20T4.SUM

Bin	D(low) microns	D(high) microns	Log D(high)	Mass Flux ug/m2/sec	Count Flux #/m2/sec	% Mass Smaller	% Count Smaller
1	10	20	1.301	0.00E+00	0.00E+00	0.000%	0.000%
2	20	30	1.477	6.98E+00	8.53E+02	0.024%	5.283%
3	30	40	1.602	1.48E+00	6.58E+01	0.030%	5.690%
4	40	50	1.699	4.40E+00	9.23E+01	0.045%	6.262%
5	50	60	1.778	1.47E+01	1.69E+02	0.097%	7.309%
6	60	70	1.845	5.62E+01	3.91E+02	0.294%	9.730%
7	70	90	1.954	1.18E+03	4.42E+03	4.432%	37.105%
8	90	110	2.041	1.64E+03	3.12E+03	10.183%	56.428%
9	110	130	2.114	2.22E+03	2.45E+03	17.969%	71.602%
10	130	150	2.176	2.50E+03	1.74E+03	26.736%	82.378%
11	150	180	2.255	2.46E+03	1.05E+03	35.363%	88.881%
12	180	210	2.322	2.15E+03	5.50E+02	42.903%	92.288%
13	210	240	2.380	2.07E+03	3.47E+02	50.163%	94.437%
14	240	270	2.431	2.59E+03	2.98E+02	59.246%	96.283%
15	270	300	2.477	2.78E+03	2.29E+02	68.995%	97.701%
16	300	350	2.544	4.56E+03	2.54E+02	84.987%	99.274%
17	350	400	2.602	1.41E+03	5.11E+01	89.932%	99.590%
18	400	450	2.653	2.26E+03	5.62E+01	97.857%	99.938%
19	450	500	2.699	4.61E+02	8.22E+00	99.474%	99.989%
20	500	600	2.778	1.50E+02	1.72E+00	100.000%	100.000%

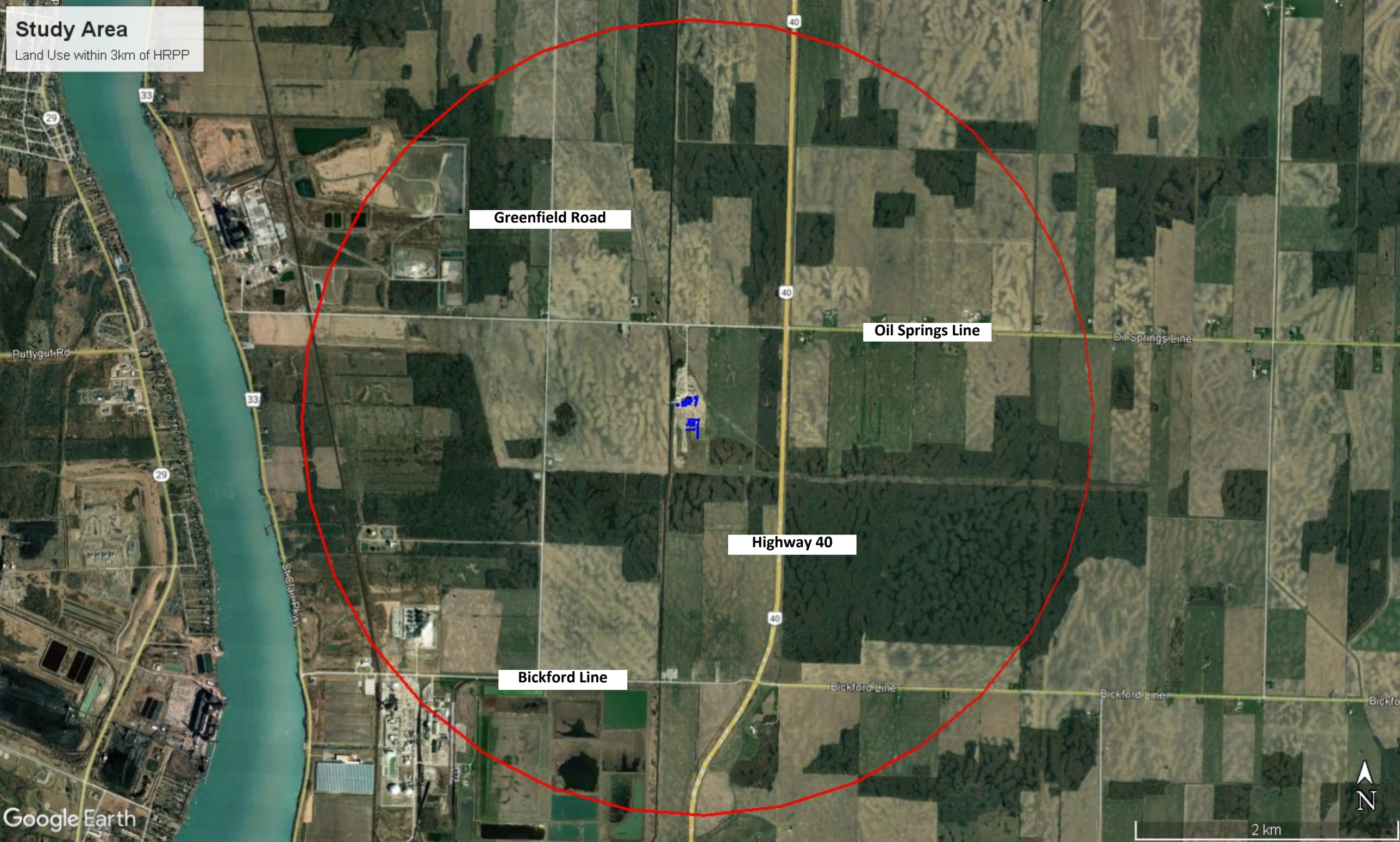
TOTAL MASS FLUX =	2.85E+04	ug/m2/sec
TOTAL COUNT FLUX =	9.60E+04	#/m2/sec
MASS MEAN DIAMETER =	242	microns
COUNT MEAN DIAMETER =	117	microns

MASS EMISSION RATE = 1.69E-01 grams/sec

BRENTWOOD INDUSTRIES
PO Box 605, 610 Morgantown Road
Reading, PA 19603 USA
phone: (610)236-1100
fax: (610)236-1199

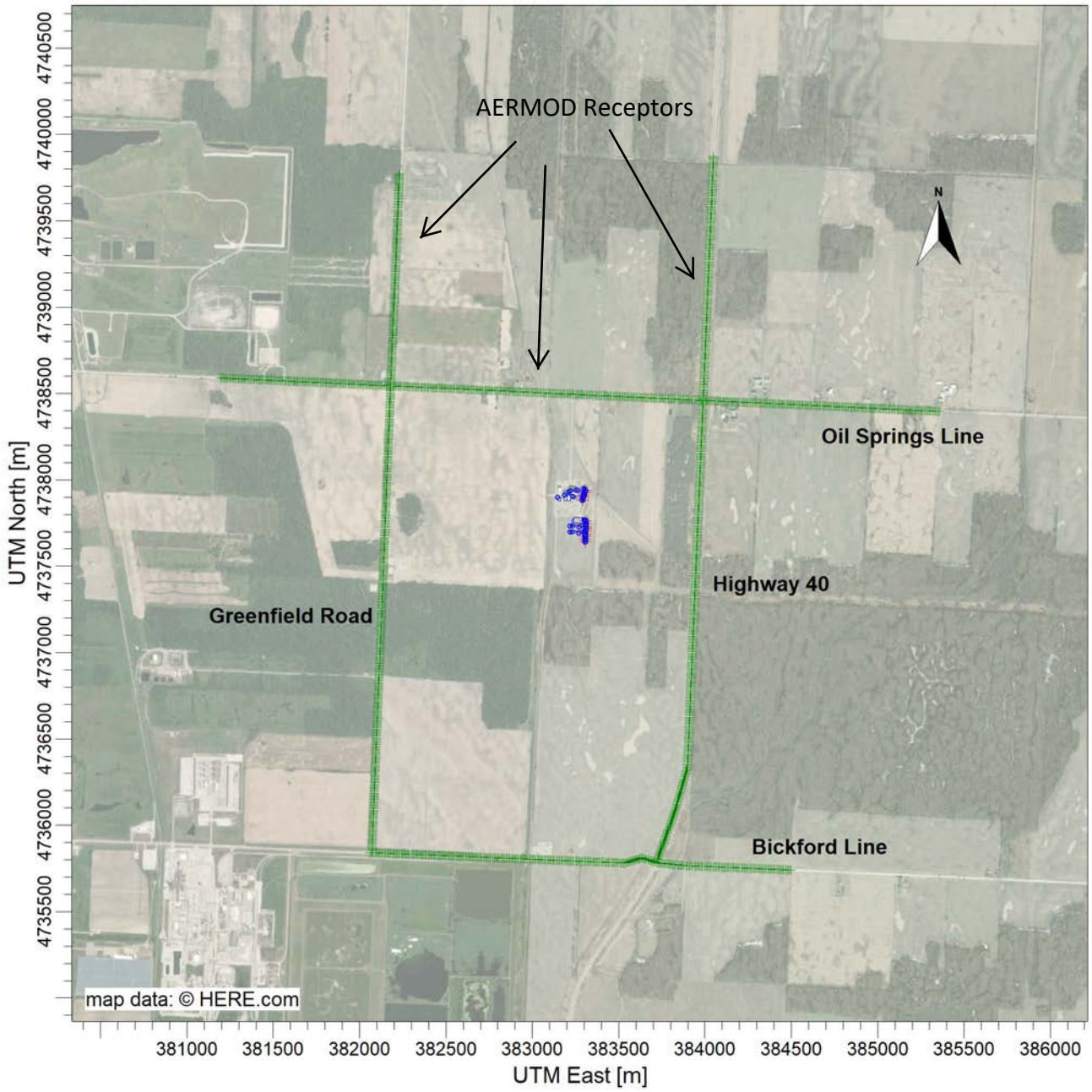
APPENDIX B

Study Area and AERMOD Layouts
(3 pages)


Study Area
Land Use within 3km of HRPP
Greenfield Road
Oil Springs Line
Highway 40
Bickford Line
Puttygut Rd
St Clair Pkwy
Google Earth
2 km
N

PROJECT TITLE:

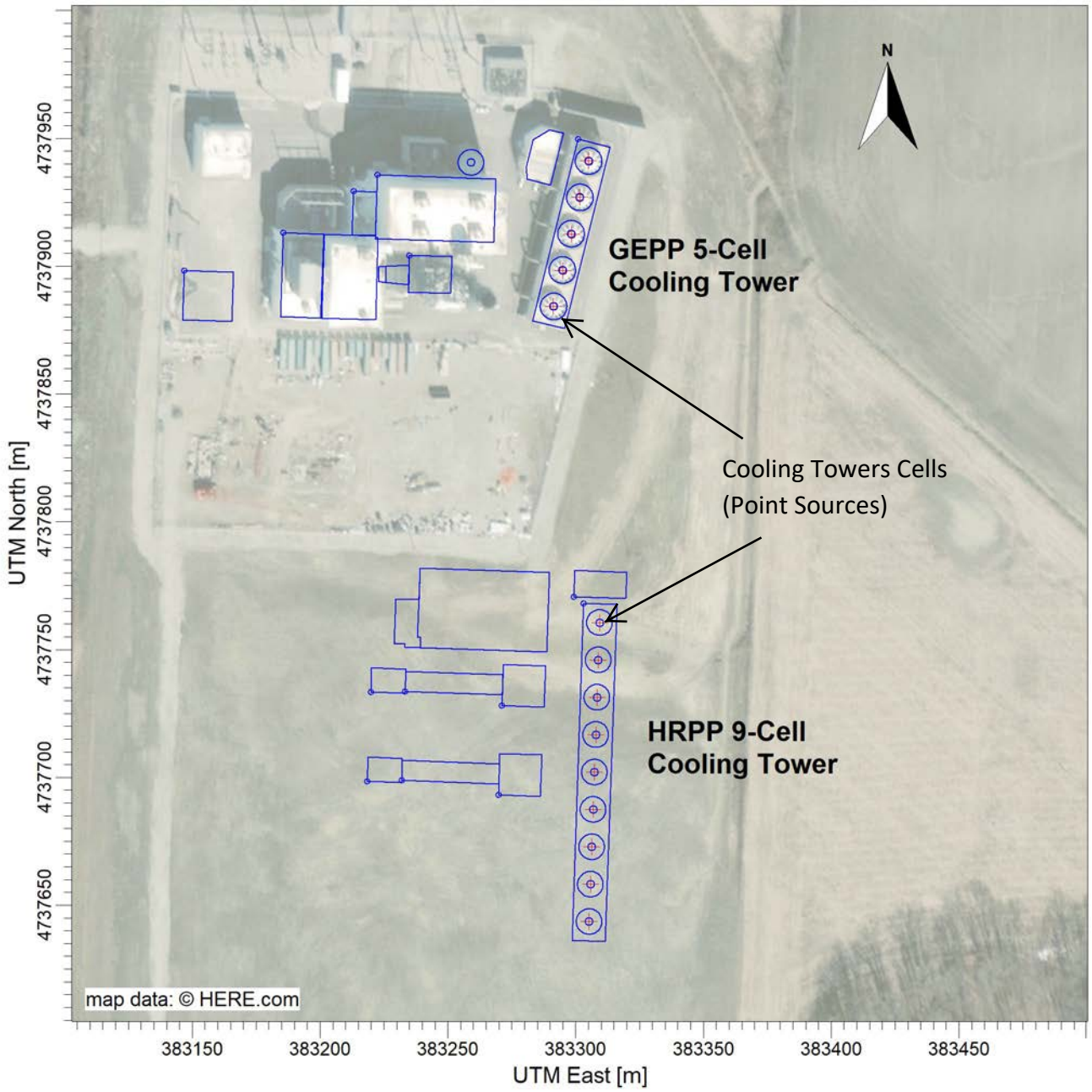
Hydrogen Ready Power Project
AERMOD Model Layout



COMMENTS:		COMPANY NAME: **ORTECH Consulting Inc.**	
		SCALE: 1:37,000 0 1 km	
			PROJECT NO.: **92460**

PROJECT TITLE:

Hydrogen Ready Power Project
AERMOD Source Layout



COMMENTS:		COMPANY NAME: **ORTECH Consulting Inc.**	
		SCALE: 1:2,500 0 0.05 km	
			PROJECT NO.: **92460**

APPENDIX C

AERMOD and SACTI2 Input/Output Files
(Electronic Copy)

Appendix B - Air Quality Impact Study Supporting Calculations

Source S1

a) Gas Turbine Generator

Methodology: Emission Factor (EF)

The gas turbine manufacturer has guaranteed the following concentration:
100% Natural Gas
- 9 ppmvd NOx (15% O_2)
- 9 ppmvd CO

80% Natural Gas, 20% Hydrogen Gas
- 15 ppmvd NOx (15% O_2)
- 9 ppmvd CO

35% Natural Gas, 65% Hydrogen Gas
- 25 ppmvd NOx (15% O_2)
- 25 ppmvd CO

PM10 were taken from the gas turbine manufacturer.

Sample Calculation (NOx 24 h average):

Exhaust Flow Rate = 1161.6 m^3/s
Exhaust Temperature = 875.2 K
Mol Weight NO_2 = 46
Density NO_2 = 101.325 / 8.314 x 46 / 875.2 = 0.641 kg/m^3
The Facility, on average will operate 10.9 h per day, during peak electricity demand.
NOx emission rate = 9 [ppm] / 1000000 x 1161.6 [m^3/s] x 0.641 [kg/m_3] x 1000 [g/kg] x 10.9 [h/day] / 24 [h/day] = 3.04 g/s

Sample Calculation (NOx 1 h average):

Exhaust Flow Rate = 1161.6 m^3/s
Exhaust Temperature = 875.2 K
Mol Weight NO_2 = 46
Density NO_2 = 101.325 / 8.314 x 46 / 875.2 = 0.641 kg/m^3
NOx emission rate = 9 [ppm] / 1000000 x 1161.6 [m^3/s] x 0.641 [kg/m_3] x 1000 [g/kg]
= 6.69 g/s

Operating Condition:
The emission rate calculations for these sources are based the gas turbine generator operating at or close to 100% capacity for 10.9 hours.

b) Heat Recovery Steam Generator (HRSG)

Methodology: Emission Factor (EF)

The HRSG duct burner emissions were taken from the guaranteed emission factors from the duct burner manufacturer:

Contaminant	Natural Gas	
	Emission Factor ($lb/MMBtu_{HHV}$)	Emission Rate (g/s)
NOx	0.10	0.95
CO	0.16	1.52
PM10	0.02	0.20

The maximum heat input to the HRSG duct is 275 MMBtu/h (LHV).

Sample Calculation (NOx 24 h average):

NOx [g/s] = 0.10 [$lb/MMBtu_{HHV}$] x 275 [$MMBtu/hr_{LHV}$] x 1.1 [$MMBtu_{HHV}/MMBTU_{LHV}$] / 2.2046 [kg/lb] x 1000 [g/kg] / 3600 [s/h]
= 3.81 g/s

The Facility, on average, will operate 10.9 h/day, during peak electricity demand.

NOx [g/s] = 3.81 [g/s] x 10.9 [h/day] x 1/24 [h/day]
= 1.73 g/s

Sample Calculation (NOx 1 h average):

NOx [g/s] = 0.10 [$lb/MMBtu_{HHV}$] x 275 [$MMBtu/h_{LHV}$] x 1.1 [$MMBtu_{HHV}/MMBTU_{LHV}$] / 2.2046 [kg/lb] x 1000 [g/kg] / 3600 [s/h]
= 3.81 g/s

Sample Calculation (CO 0.5 h average):

NOx [g/s] = 0.16 [$lb/MMBtu_{HHV}$] x 275 [$MMBtu/h_{LHV}$] x 1.1 [$MMBtu_{HHV}/MMBTU_{LHV}$] / 2.2046 [kg/lb] x 1000 [g/kg] / 3600 [s/h]
= 6.10 g/s

Operating Condition:
The emission rate calculation for these sources is based the HRSG duct burner operating at or close to 100% capacity for 10.9 hours.

Start Up Emission Calculation

Hot Start Emission Rate Calculation

	A	B	C	D	E	F
	% Load	Minutes	NOx	NOx Total	CO	CO Total
			lb/h	lb	lb/h	lb
1	10	4.0	100.0	6.7	1000.0	66.7
2	20	26.0	200.0	86.7	80.0	34.7
3	30	1.5	280.0	7.0	1010.0	25.3
4	40	1.5	330.0	8.3	900.0	22.5
5	50	1.5	39.0	1.0	21.0	0.5
6	60	3.0	42.0	2.1	23.0	1.2
7	80	3.0	50.0	2.5	24.0	1.2
8	Total	40.5		114.2		152.0

	NOx	**CO**
Emission Rate (g/s)	**21.3**	**28.4**

Notes:
D = C x (B/60)
F = E x (B/60)
Emission Rate (NOx) = D8/(B8/60)/3600/2.2046(1000)
Emission Rate (CO) = E8/(B8/60)/3600/2.2046(1000)

Warm Start Emission Rate Calculation

	A	B	C	D	E	E
	% Load	Minutes	NOx	NOx Total	CO	CO Total
			lb/h	lb	lb/h	lb
1	10	50.0	100.0	83.3	1000.0	833.3
2	15	10.0	140.0	23.3	380.0	63.3
3	30	2.5	280.0	11.7	1010.0	42.1
4	40	2.5	330.0	13.8	900.0	37.5
5	50	2.5	39.0	1.6	21.0	0.9
6	60	2.5	42.0	1.8	23.0	1.0
7	80	10.0	50.0	8.3	24.0	4.0
8	Total	80.0		143.8		982.1

	NOx	**CO**
Emission Rate (g/s)	**13.6**	**92.8**

Notes:
For SO2 emission rate calculation, see below
D = C x (B/60)
F = E x (B/60)
Emission Rate (NOx) = D8/(B8/60)/3600/2.2046(1000)
Emission Rate (CO) = E8/(B8/60)/3600/2.2046(1000)

Cold Start Emission Rate Calculation

	A	B	C	D	E	E
	% Load	Minutes	NOx	NOx Total	CO	CO Total
			lb/h	lb	lb/h	lb
1	8	148.0	140.0	345.3	180.0	444.0
2	15	17.0	140.0	39.7	380.0	107.7
3	30	4.5	280.0	21.0	1010.0	75.8
4	40	4.5	330.0	24.8	900.0	67.5
5	50	4.5	39.0	2.9	21.0	1.6
6	60	4.5	42.0	3.2	23.0	1.7
7	80	4.5	50.0	3.8	24.0	1.8
8	Total	187.5		440.6		700.0
				NOx		**CO**
			Emission Rate (g/s)	**17.8**		**28.2**

Notes:
For SO2 emission rate calculation, see below
D = C x (B/60)
F = E x (B/60)
Emission Rate (NOx) = D8/(B8/60)/3600/2.2046(1000)
Emission Rate (CO) = E8/(B8/60)/3600/2.2046(1000)

		Hot Start			Full Load Operation			Start up followed by full operation - 100% Natural gas (for Table 9)				
		total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	24 h average period (g/s)	0.5 h and 1 h average period (g/s)
1	NOx	0.68	51781.9	21.31	10.90	412361.4	10.51	1`1.58	464143.3	11.14	5.37	11.14
2	CO	0.68	68927.8	28.37	10.90	399264.3	10.17	11.58	468192.2	11.24	5.42	11.24
3	SO2	0.68	0.0	0.00	10.90	0.0	0.00	11.58	0.0	0.00	0.00	0.00
4	PM	0.68	3960.9	1.63	10.90	93873.7	2.39	11.58	97834.6	2.35	1.13	2.35
		A	B	C	D	E	F	G	H	I	J	K

The highlighted data are the maximum emission rate according to the averaging period for the relevant MECP POI Limit corresponding to the respective contaminant

Sample Calculation (NOx)
Total Emissions (B1) = C1 x 3600 x A1
Total Emissions (E1) = F1 x 3600 x D1
Total hours (G1) = A1 + D1
Total Emissions (H1) = B1 + E1
Emission Rate (I1) = H1 / G1 /3600
24-hour Average (J1) = I1 x G1 / 24

		Warm Start			Full Load Operation			Start up followed by full operation - 100% Natural gas for Table 9)				
		total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	24 h average period (g/s)	0.5 h and 1 h average period (g/s)
1	NOx	1.33	65223.5	13.59	10.90	412361.4	10.51	12.23	477584.9	10.84	5.53	10.84
2	CO	1.33	445470.1	92.81	10.90	399264.3	10.17	12.23	844734.4	19.18	9.78	19.18
3	SO2	1.33	0.0	0.00	10.90	0.0	0.00	12.23	0.0	0.00	0.00	0.00
4	PM	1.33	7824.0	1.63	10.90	93873.7	2.39	12.23	101697.7	2.31	1.18	2.31
		A	B	C	D	E	F	G	H	I	J	K

		Cold Start			Full Load Operation			Start up followed by full operation - 100% Natural gas (for Table 9)				
		total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	24 h average period (g/s)	0.5 h and 1 h average period (g/s)
1	NOx	3.13	199843.5	17.76	10.90	412361.4	10.51	14.03	612204.9	12.13	7.09	12.13
2	CO	3.13	317525.5	28.22	10.90	399264.3	10.17	14.03	716789.8	14.20	8.30	14.20
3	SO2	3.13	0.0	0.00	10.90	0.0	0.00	14.03	0.0	0.00	0.00	0.00
4	PM	3.13	18337.5	1.63	10.90	93873.7	2.39	14.03	112211.2	2.22	1.30	2.22
		A	B	C	D	E	F	G	H	I	J	K

		Hot Start			Full Load Operation			Start up followed by full operation - 80% Natural gas, 20% Hydrogen Gas (for Table 9)				
		total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	24 h average period (g/s)	0.5 h and 1 h average period (g/s)
1	NOx	0.68	51781.9	21.31	10.90	587032.5	14.96	11.58	638814.3	15.33	7.39	15.33
2	CO	0.68	68927.8	28.37	10.90	399071.4	10.17	11.58	467999.2	11.23	5.42	11.23
3	SO2	0.68	0.0	0.00	10.90	0.0	0.00	11.58	0.0	0.00	0.0	0.0
4	PM	0.68	3960.9	1.63	10.90	93873.7	2.39	11.58	97834.6	2.35	1.13	2.35
		A	B	C	D	E	F	G	H	I	J	K

		Warm Start			Full Load Operation			Start up followed by full operation - 80% Natural gas, 20% Hydrogen Gas (for Table 9)				
		total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	24 h average period (g/s)	0.5 h and 1 h average period (g/s)
1	NOx	1.33	65223.5	13.59	10.90	587032.5	14.96	12.23	652255.9	14.81	7.55	14.81
2	CO	1.33	445470.1	92.81	10.90	399071.4	10.17	12.23	844541.4	19.18	9.77	19.18
3	SO2	1.33	0.0	0.00	10.90	0.0	0.00	12.23	0.0	0.00	0.00	0.00
4	PM	1.33	7824.0	1.63	10.90	93873.7	2.39	12.23	101697.7	2.31	1.18	2.31
		A	B	C	D	E	F	G	H	I	J	K

		Cold Start			Full Load Operation			Start up followed by full operation - 80% Natural gas, 20% Hydrogen Gas (for Table 9)				
		total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	24 h average period (g/s)	0.5 h and 1 h average period (g/s)
1	NOx	3.13	199843.5	17.76	10.90	587032.5	14.96	14.03	786876.0	15.58	9.11	15.58
2	CO	3.13	317525.5	28.22	10.90	399071.4	10.17	14.03	716596.8	14.19	8.29	14.19
3	SO2	3.13	0.0	0.00	10.90	0.0	0.00	14.03	0.0	0.00	0.00	0.00
4	PM	3.13	18337.5	1.63	10.90	93873.7	2.39	14.03	112211.2	2.22	1.30	2.22
		A	B	C	D	E	F	G	H	I	J	K

		Hot Start			Full Load Operation (35%NG+65%H2)			Start up followed by full operation - 35%NG+65%H2 (for Table 9)				
		total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	24 h average period (g/s)	0.5 h and 1 h average period (g/s)
1	NOx	0.68	51781.9	21.31	10.90	875597.2	22.31	11.58	927379.1	22.26	10.73	22.26
2	CO	0.68	68927.8	28.37	10.90	681234.0	17.36	11.58	750161.8	18.00	8.68	18.00
3	SO2	0.68	0.0	0.00	10.90	0.0	0.00	11.58	0.0	0.00	0.00	0.00
4	PM	0.68	3960.9	1.63	10.90	93873.7	2.39	11.58	97834.6	2.35	1.13	2.35
		A	B	C	D	E	F	G	H	I	J	K

		Warm Start			Full Load Operation (35%NG+65%H2)			Start up followed by full operation - 35%NG+65%H2 (for Table 9)				
		total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	24 h average period (g/s)	0.5 h and 1 h average period (g/s)
1	NOx	1.33	65223.5	13.59	10.90	875597.2	22.31	12.23	940820.7	21.36	10.89	21.36
2	CO	1.33	445470.1	92.81	10.90	681234.0	17.36	12.23	1126704.0	25.58	13.04	25.58
3	SO2	1.33	0.0	0.00	10.90	0.0	0.00	12.23	0.0	0.00	0.00	0.00
4	PM	1.33	7824.0	1.63	10.90	93873.7	2.39	12.23	101697.7	2.31	1.18	2.31
		A	B	C	D	E	F	G	H	I	J	K

		Cold Start			Full Load Operation (35%NG+65%H2)			Start up followed by full operation - 35%NG+65%H2 (for Table 9)				
		total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	total hours	total emissions (g)	emission rate (g/s)	24 h average period (g/s)	0.5 h and 1 h average period (g/s)
1	NOx	3.13	199843.5	17.76	10.90	875597.2	22.31	14.03	1075440.7	21.30	12.45	21.30
2	CO	3.13	317525.5	28.22	10.90	681234.0	17.36	14.03	998759.4	19.78	11.56	19.78
3	SO2	3.13	0.0	0.00	10.90	0.0	0.00	14.03	0.0	0.00	0.00	0.00
4	PM	3.13	18337.5	1.63	10.90	93873.7	2.39	14.03	112211.2	2.22	1.30	2.22
		A	B	C	D	E	F	G	H	I	J	K

Greenhouse Gas Sample Calculation

<u>100% Natural Gas</u>

Annual Volume of Natural Gas used = 130567303.30 m^3
Carbon Content in NG = 0.749 kg C/kg NG
Molecular Weight of NG = 17.31
Ratio of molecular weight CO_2 to C = 3.664
Conversion from kg to tonne = 10^{-3} kg/t

Carbon Dioxide = 3.664 x 130567303.30 x (17.31 / 23.645) x 0.749 x 10^{-3}
= 262122.11 tonne

NG Heat Input = 9611910 MMBTU/h
Methane Emission Factor = 13 g/GJ
Global Warming Potential = 25
Nitrous Oxide Emission Factor = 1.3 g/GJ
Global Warming Potential = 298

Methane = 9611910 x 10^6 x 1.055056 x 13 x 10^{-12}
= 131.83 tonne
Methane GHG eq = 131.83 x 25
= 3295.86 tonne
Nitrous Oxide = 9611910 x 10^6 x 1.055056 x 1.3 x 10^{-12}
= 13.18 tonne
Nitrous Oxide GHG eq = 3928.66 tonne

<u>35% Natural Gas, 36% Hydrogen Gas</u>

Annual Volume of Natural Gas used = 57397255.64 m^3

Carbon Content in NG = 0.749 kg C/kg NG
Molecular Weight of NG = 17.31
Ratio of molecular weight CO_2 to C = 3.664
Conversion from kg to tonne = 10^{-3} kg/t

Carbon Dioxide = 3.664 x 57397255.64 x (17.31 / 23.645) x 0.749 x 10^{-3}
= 115228.61 tonne

NG Heat Input = 4225386 MMBTU/h
Methane Emission Factor = 13 g/GJ
Global Warming Potential = 25
Nitrous Oxide Emission Factor = 1.3 g/GJ
Global Warming Potential = 298

Methane = 4225386 x 10^{6} x 1.055056 x 13 x 10^{-12}
= 57.95tonne
Methane GHG eq = 131.83 x 25
= 1448.86 tonne
Nitrous Oxide = 4225386 x 10^{6} x 1.055056 x 1.3 x 10^{-12}
= 5.795 tonne
Nitrous Oxide GHG eq = 1727.04 tonne

A-5 Emission Limits for Gas Turbine Calculation

Facility configuration = Combined Cycle
Heat Input to gas turbine = 1814.70 GJ/h / 3.6 MW/(GJ/h)
= 504.08 MW
Gas Turbine Gross Power Output = 195.3 MW

Heat Input to HRSG duct burner = 290.14 GJ/h / 3.6 MW/(GJ/h)
= 80.59 MW
Steam Turbine Gross Power Output = 175.50 MW

Total Heat Input = 504.08 + 80.59
= 584.67 MW
Total Gross Power Output = 195.3 + 175.5
= 370.80 MW

Gross Thermal Efficiency = 370.80 / 584.67 x 100
= 63.4%

<u>100% Natural Gas</u>
F-Factor for NG = 240 DSm^3/GJ
From Table 1 Output-based NOx Limit = 140 g/GJ
NOx Emission Limit = 370.80 x 140 x 3.6
= 186833 g/h (Equation 5)
Calculated NOx Concentration Limit = 1886833/240/(584.67 x 3.6)/1.88/10^{-3}/(20.9/(20.9-15))
= 55.6 ppmv

<u>35% Natural Gas, 65% Hydrogen Gas</u>
Hydrogen HHV = 142180 kJ/kg
K_{hd} = 22.97 Sm^3/kg (ECCC Reference Method for Source Testing Appendix A, A.3)
F_d (H_2) = 22.97 / 142180 x 1000 = 161.5558 m^3/GJ
F_d (NG) = 240 m^3/GJ
%H2 vol = 65%

%NG vol = 35%
STD Pressure = 101.325 kPa
STD Temperature = 298.15 K
H2 Density = 101.325 / (8.314/2.016)/298.15 = 0.0824 kg/m^3
NG Density = 101.325 / (8.314/17.305)/298.15 = 0.602 kg/m3
%H2 mass = (65 x 0.0824)/(65 x 0.0824 + 35 x 0.602) = 20.3%
%NG mass = (35 x 0.602)/(65 x 0.0824 + 35 x 0.602) = 79.7%

Fm (NG+H2) = (0.203 x 161.5558) + (0.797 x 240) = 224.10 DSm^3/GJ (ECCC Reference Method for Source Testing Appendix A, A.2, Equation A-1)
From Table 1 Output-based NOx Limit = 140 g/GJ
NOx Emission Limit = 370.80 x 140 x 3.6
= 186833 g/h (Equation 5)
Calculated NOx Concentration Limit = 1886833/224.10/(584.67 x 3.6)/1.88/10^{-3}/(20.9/(20.9-15))
= 59.5 ppmv

References

1. Environment Canada. Canadian Climate Normals, 1981-2010. National Climate Date and Information Archive Website, https://climate.weather.gc.ca/climate_normals/results_1981_2010_e.html?stnID=4789&dispBack=0&month1=0&month2=12
2. Ontario Ministry of the Environment, Conservation and Parks Website: http://www.airqualityontario.com/history/index.php, Sarnia
3. Ontario Ministry of the Environment, Conservation and Park Website: http://www.airqualityontario.com/press/publications.php, Air Quality in Ontario Report & Appendix (2018)
4. Ontario Ministry of the Environment, Conservation and Parks. "Guideline A-5 Atmospheric Emissions from Stationary Combustion Turbine", March 2021
5. Ontario Ministry of the Environment, Conservation and Parks. "Guideline A-10 Procedure for Preparing an Emission Summary and Dispersion Modeling Report", Ver. 4.1, March 2018
6. Ontario Ministry of the Environment, Conservation and Parks. "Guideline A-11 Air Dispersion Modelling Guideline for Ontario", Ver. 3.0
7. Ontario Ministry of the Environment, Conservation and Parks, "Guideline for Quantification, Reporting and Verification of Greenhouse Gas Emissions", February 2020
8. Ontario Regulation 419/05, Environmental Protection Act, R.S.O. 1990
9. LEHDER Environmental Services Limited, "Compliance Report, Greenfield South Power Corporation, Green Electron Power Plant", November 2017
10. LEHDER Environmental Services Limited, "Compliance Report, Greenfield South Power Corporation, Green Electron Power Plant", September 2019
11. Montrose Environmental Group Ltd., "Compliance Report, Greenfield South Power Corporation, Green Electron Power Plant", July 2021
12. United States Environmental Protection Agency. Web Factor Information Retrieval (WebFIRE) Data System, https://www3.epa.gov/ttn/chief/webfire/index.html
13. United States Environmental Protection Agency. AP 42, Fifth Edition, Volume 1, Chapter3: Stationary Internal Combustion Sources, 3.1 Stationary Gas Turbines, https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-fifth-edition-volume-i-chapter-3-stationary-0
14. Environment Canada and Climate Change, "Canada's Greenhouse Gas Quantification Requirements", Ver 4.0
15. Environment Canada and Climate Change, "Reference Method for Source Testing: Quantification of Carbon Dioxide Releases by Continuous Monitoring Systems from Thermal Power Generation", Appendix A. F-factors https://ec.gc.ca/doc/cc/COM1343/a_a-eng.htm#a_a_3
16. Clean Air Sarnia and Area (CASA) Air Monitoring Network website (CASA)