Environmental Assessment Board

C/o The Environmental Protection Agency
Ganges Street, Sophia,
Georgetown

May 10, 2023

Mr. Kemraj Parsram
Executive Director
The Environmental Protection Agency
Ganges Street, Sophia
Georgetown.

Dear Mr. Parsram,

Decision of the Environmental Assessment Board (EAB) on the Project: Construction and Operation of 300 MW Natural Gas-Fired Power Plant

Background

The Environmental Protection Agency ("EPA") under Sec.11(2)(a) of the Environmental Protection Act, (the "Act") on January 6, 2023, published its decision with reasons to exempt the proposed project, construction and operation of 300MW Natural Gas-Fired Power Plant, from the requirement for an Environmental Impact Assessment ("EIA").

The Environmental Assessment Board ("EAB") received two appeals dated February 3rd & 5th, 2023, under Sec.11(3) of the Act, within the statutory timeline of thirty (30) days of the date of publication of the Agency's decision. The EAB, in compliance with Sec.18 of the Act and Sec.6 of the Third Schedule of the Act, published a fourteen [14] days' notice on the March 5th, 2023, for a public hearing.

The EAB convened a public hearing under Sec.18(2) of the Act, on the 22nd of March 2023. All parties were heard in person and included oral presentations were made by the Appellants, the Developer, and the EPA under Sec.6 of the Third Schedule of the Act.

The Appellants' presentations were generally in keeping with their written submissions. From the oral and written presentations, the Appellants identified legal and technical areas for which they are concerned and which served as the basis for their opposition to the EPA's decision to waive an EIA for the said project.

The project application was made by the Guyana Power and Light Inc. (GPL). Subsequently, the Gas to Energy Task Force, via GPL, notified the EPA that a new company, Guyana Power and Gas Inc., will be the project proponent. This new company is wholly owned by the State. The relevant documentation, certificate of incorporation and other details were provided and are publicly available.

The Developer provided an overview of Guyana's Gas to Energy Project which included the 300 MW Natural Gas-Fired Power Plant including the services that will be provided, the economic benefits, and the identified potential impacts on the surrounding environment. The potential impacts on the surrounding environment included routine flaring of the power plant and impacts on air and water quality. The Developer also outlined the project's proposed location and surrounding receptors.

The EPA presented its legal mandate under Sec.4 and 11 of the Act which authorizes it to assess and waive an EIA for any development activities listed in the Fourth Schedule or any other activities which may significantly affect the environment. Their presentation also provided a background of the project, an overview of the screening process results, and key reasons for the decision to waive the EIA.

The EAB examined all information presented to the Board on this project, including submissions made at the public hearing in relation to the EPA's decision to waive the requirement for an EIA for the Construction and Operation of the 300 MW Natural Gas-Fired Power Plant.

The EAB noted the objections raised by the appellants and makes the following observations:

1. **EPA's authority to not require an EIA** - Sec.11 of the Act, mandates that the EPA decides whether an EIA is required and subsequently publish its decision with reasons regarding the exemption of the project. The Act does not mandate the requirement of an EIA for any particular project or categories of projects, as the decisions remain that of the EPA. This is reflected/confirmed in the recent ruling by Justice N. Harnanan in Radzik et al -v- The EPA et al via paragraph 56 – "EPA by Sec.11(2) of the Act is mandated to determine whether the project requires an EIA or not." The EPA is not in breach of its statutory duty. Furthermore, it is not debarred from relying on information beyond Sec.11 of the Act to execute its mandate under Sec.4(1)(a) of the Act – that the EPA shall take every step to make an informed decision and effectively manage the environment.

2. **Definition of the Area of Influence (AOI)** - The area of influence can be defined as the area with the potential to be impacted by the project. The location of the 300 MW power plant is Zone HI-2 of Maria's Lodge at the Wales Development Zone, West Bank Demerara, Region Three. The Demerara River is located approximately 1.8 km from the project site; the Boerasirie Conservancy, agricultural lands (in close proximity of the project site) were also considered to be in the area of influence. This project is situated within the boundaries of the location identified for the Gas to Energy project.

3. **Danger posed by gas plants and pipelines** – All development projects have some inherent risk and danger. It lies with the developers and regulators to ensure that all potential risks and associated mitigation measures have been identified and the necessary emergency response plans are in place. In the first instance, the location of the proposed power plant is generally in an isolated area and more than 2 km away from communities. Further, the project is situated within what is identified by the Central Housing and Planning Authority (CH&PA) to be the Wales Planning Area/Wales Development Zone in a parcel of land earmarked for "heavy and hazardous" industrial activity. The project proposes that mitigation measures such as Gas Leak Detection systems, Fire management and emergency management, etc. are in place. Furthermore, an Environment and Social Management Plan (ESMP) which addresses fires/explosions and other key risks, and detailed management measures will be required.

4. **Impacts on Humans** - The key Valued Environmental and Social Components (VECS) were assessed related to environmental and human health.

5. **Air Quality Impacts: Emissions (dust, toxic gases and flaring)**

   Reports on Negative Impacts of Gas Plants on Communities – The appellant stated that their major concern was mainly air quality impacts (SO_2, NOx, PM, CO_2 and Hg emissions) and their effects on human health. On this matter, the Cumulative Impacts Assessment (CIA) indicates that the maximum onshore concentrations from the cumulative case to be no more than 56% of the ambient air quality guidelines for nitrogen dioxide (NO_2), no more than 9% of the ambient air quality guidelines for particulate matter with an aerodynamic diameter of fewer than 2.5 micrometres, and no more than 3% of the ambient air quality guidelines for any of the other parameters subjected to modelling. Nonetheless, the total predicted concentrations (i.e., cumulative case sources plus ambient background concentrations) are below the guideline concentrations for NO_2 for all averaging periods and rankings.

   Additionally, while the Project represents an increase in Greenhouse Gas (GHG) emissions, the percentage increase relative to national GHG emissions is less than 1% per cent, and the percentage increases relative to regional and global emissions are all several orders of magnitude below 1%. Moreover, this type of design uses both gas and steam turbines, which reduces the burning of fossil fuel by approximately 35% than that of a simple traditional cycle plant. The heated water generated from the gas turbine will then be routed to the nearby turbine, which will generate additional power. With the decrease in burning fossil fuel, air emissions will be significantly lower than that of the plant traditional models.

The EAB was informed that the project, during the construction stage, will produce localized temporary and mitigable emissions as dust control measures will be employed. In the operations stage of the project, in relation to air emissions of greenhouse gases (GHGs), Sulfur dioxide (SO2), nitrogen oxides (NOx), carbon monoxide (CO), particulate matter (PM 2.5 and PM 10), and methane (in upset conditions and primarily leaks), mitigating measures and embedded controls inclusive of the Dry Low NOx combustors, selective catalytic reduction control, and siemens technology will be utilized. This also includes the cleaning of the natural gas by the NGL facility, reducing the expected particulate matter and sulphur. Also taken into account were the results of the EEGPL Gas-to-Shore project Environmental Impact Assessment – regarding the cumulative impacts results of the modeling that revealed that the concentrations of key pollutants will be within the World Health Organization (WHO) stipulated limits (pp 45, Vol.2, Appendix L, GTE EIA 2022).

Reviews of Environment Impact Assessment reports for similar natural gas power plants show that negative air quality impacts are reduced when natural gas power plants, particularly more efficient combined cycle natural gas power plants, replace other fossil fuel generation technologies.

Furthermore, as the power plant falls within the area of influence of the Gas to Energy Project, which has been approved by the Agency, the CIA of the Gas to Energy project has been considered during the screening of the power plant. According to the CIA conducted, the power plant will temporarily impact air quality, however, due to the use of design/embedded controls, the impacts on air quality will be minimized.

Methane Leakage in Natural Gas Production – The CIA indicates that embedded controls and mitigation measures will minimise any adverse environmental impacts resulting from the proposed project as it relates to methane leakage. There will be numerous layers of protection to prevent a release of natural gas (primarily methane) from the Power Plant as presented in the CIA and the design document, including the following:

- Industry-standard design standards (e.g., appropriate material selection, corrosion protection) ensures the material selected is best suited for the operating environment
- Mechanical integrity programs as part of routine operations and maintenance Overpressure protection;
- Isolation and blowdown system capabilities and procedures;
- Preventive maintenance programs (e.g., periodic inspection, corrosion management) which act as a preventative measure to maintain the integrity of the pipeline and other equipment
- Emergency shutdown system which will be automatically triggered for optimum

response rates;
- Process shutdown system; and
- Active and passive fire protection

Furthermore, assuming a full-bore rupture, natural gas that would be lost to the atmosphere would be on the order of 2.5 kilotonnes of methane. This equates to approximately 62 kilotonnes of carbon dioxide equivalent (CO_2e). On the basis that this represents an approximately 1.3% increase in the most recently reported annual emissions for Guyana (4,671 kilotonnes), the consequence/severity of this event is rated as "Low". In combination with a likelihood rating of "Unlikely" for a loss of integrity of the offshore pipeline, the overall risk to climate and climate change would be "Minor."

Explosions – Unplanned events, such as a fuel spill or a loss of integrity of the infrastructure of the NGL Plant resulting in a fire or explosion, are considered unlikely to occur due to the extensive preventive measures to be employed; nevertheless, events such as these are considered in the documents submitted and summarized below:

a) Flame detectors will be used to provide rapid detection of a fire in areas handling hydrocarbons, and a number of flame detectors will be networked to provide a confirmed fire alarm.

b) An Integrated Control and Safety System will provide an integrated monitoring, control, protection, and safety system for the entire production facility. The safety system will be separate from the Process Control System.

c) Gas detectors will be installed at strategic locations in the plant and utility areas and in air intakes to buildings and turbine hoods. Open path- (i.e., beam-) type gas detectors will be installed in hydrocarbon processing areas in conjunction with point-type gas detectors. The use of point-type, beam-type, or a combination of point-type and beam-type detectors will help to avoid false alarms. Supplementary ultrasonic detection may be installed for modules where high-leak-potential equipment is located, or where ventilation rates reduce the probability of successful detection by other methods.

d) The fire and gas detection system will be supplied with a stand-alone redundant uninterruptible power supply.

e) Blast protection will be provided where necessary, as determined by a Front End Engineering and Design (FEED) fire and explosion hazard assessment and passive fire protection study. Where necessary, firewalls will also be designed for blast protection.

An explosion would only be likely to occur if the gas is released into a congested space. A

congested space can be defined as any space within which there is an obstruction to the free movement of a gas through the space. The most likely places where obstructions would be present near the onshore pipeline would be densely forested areas or thick undergrowth. Consequently, open areas—such as that characterized by the onshore pipeline corridor—are unlikely to be conducive to an explosion in the case of a hydrocarbon release from the onshore pipeline.

Additionally, the Power Plant will be constructed using international good practices, which will reduce the likelihood of stresses building up in the pipeline walls thereby reducing the likelihood of buckling. A leak would be quickly detected and isolated using emergency shut down valves, which will limit inventory loss and therefore the duration of any release event. Based on the potential consequence/severity of a loss of integrity of the pipeline and considering that it is unlikely given the suite of preventive measures in place, the assessment assigned a "Minor" residual risk rating for all resources that could be impacted by this unplanned event.

Nevertheless, some of the embedded controls and mitigation measures taken include;

a) The equipment will be designed to a Class 3 location classification which includes higher design factors, including increased wall thickness.

b) A fiber optic cable-based system will be installed at the time the pipeline is buried, to detect leaks and/or third-party intrusion to the pipeline.

c) With respect to the potential corrosion causal factor, relevant embedded controls include external corrosion coating for equipment, installation and monitoring of an impressed current cathodic protection system, and routine internal inspections for corrosion through the use of pipeline intelligent pigging tools

The project description asserts that design integrity assures no loss of containment by conducting testing, welding, and inspection. Emergency Response Procedures will also be prepared during design. Additionally, firefighting equipment and gas detection equipment will determine if there is a leak. If detected, the equipment immediately alerts the operators, the plant will be shut down, and the water monitors will be activated to prevent the leak from igniting. Finally, the line is designed in such a way that it is unlikely anything could ever truly cause it to break. The focus has been on over engineering the pipeline, ensuring proper metallurgy in the pipe, detailed inspection of welds using x-rays to ensure the integrity of the welds, and periodic inspection with pigs to prevent leaks. With the adoption of such controls, mitigation measures, and management plans, and requirements for emergency response preparedness, the Project is expected to pose only manageable risks to the environmental and socioeconomic resources of Guyana.

Gas Dispersion Modelling – As part of the CIA, the GtE EIA Appendix L indicates that modeling of emissions to air was completed with the base case including the NGL Plant operations stage. To assess the cumulative impact, the planned Power Plant was also modelled along with other existing, permitted or planned EEPGL offshore activities.

6. **Noise Impacts** – The nearest receptors/residents/communities are more than 2 km away. Additionally, the EAB was informed that noise impacts during the construction and operation will be localized. Noise and vibration for the construction phase will be short-term and restricted to areas adjacent to the source, as the mitigation measures include the use of design practices to limit noise emissions such as noise deflection structures, plant placement, and the use of industry best practices. The operation phase noise level is expected to be within acceptable decibel levels – not exceeding 60dB – beyond 500 meters. The mitigation measures are inclusive of the procurement of equipment designed to not exceed 85 dB or 115 dB in upset conditions and appropriate personal protective equipment (PPE) (ear/hearing protection) will be mandatory.

7. **Water Quality Impacts** – The potential impacts during the construction phase from stormwater runoff is the sedimentation of nearby waterways which will be short-term and localized and will be mitigated by industry standard mitigation measures. The operation phases include the treated process water or wastewater that is likely to be discharged into the Demerara River. The mitigating measures will include the treatment of water via a water treatment facility to meet IFC/World Bank standards before discharge. Additional measures include the use of design best practices to limit the contamination of surface water. Additionally, water treatment facilities will be in place to treat process water prior to being directed into the stormwater pond, before discharge into the environment.

   Primarily relating to the groundwater, the impacts as to the abstraction volume are expected at approximately 265-300m^3/hour for service and potable water systems. Individually and cumulatively, there will be no significant impacts on the availability of groundwater resources. With the available water resources of approximately 208 metres (yield per well range 240-2400 m^3/hour) in the aquifer with 88m^3/hour/well drawn down by the power plant this equates to 3-36 percent of available water per well/hour and less than 1 percent of the remaining drawdown of the A Sand aquifer at a distance of 500m, therefore the projected abstraction rate will have negligible impact on the supply of groundwater within the general area of the power plant. The mitigation measures are inclusive of water reuse and optimization measures in final design storage.

8. **Biodiversity and Ecosystems** – Terrestrial biodiversity in the area are common generalist species with moderate to high tolerance to human disturbance. Construction

will be short duration and will therefore not experience a population level disturbance to any species or permanently alter the ecological conditions. Impacts to vegetation/habitats will be limited to already disturbed/modified areas such as agriculture and irrigation structures. The project is not expected to impact riverine biodiversity given the embedded controls and treatment of any discharges.

9. **Impacts on Soil and Waste Management** – Soil contamination could be due to improper usage and/or unmitigated spill of lubricants/used oil, however, such spills can be contained and cleaned up. The mitigation measures include the proper and regular maintenance of the equipment, vehicles, and access to spillage kits and training for all employees.

   Non-hazardous, hazardous, and, domestic wastes are expected to be negligible. The mitigation measures include the segregation of waste and placement in appropriate bins with containers, away from sunlight and rain. Additionally, each type of waste will be transported to an EPA-approved local sanitation provider. A waste management plan and secondary containment with appropriate drainage connections and/or provisions for the removal of spilled liquids will be required.

10. **Environment Permitting of electrical transmission lines and substations** – Transmission lines would require a separate environmental authorisation application and process of review and approval. At this time, the project under consideration is the construction and operation of the 300 MW Natural Gas-Fired Power Plant situated within the GTE project location.

Decision of the EAB

Having followed the process outlined in the EPA Act, and considering all of the concerns, comments and responses submitted in writing and made orally during the Public Hearing in relation to the Environmental Protection Agency's (EPA) decision to waive the requirement for an Environmental Impact Assessment (EIA) for the Construction and Operation of a 300 MW Natural Gas-Fired Power Plant, the EAB has completed its process to render its decision.

The EAB found that there are proposed mitigation measures for the expected environmental impacts included in the project summary and other supporting documentation submitted by the developer, that the appellants may not have been privy to. The appellants appear to have based their arguments solely on the information presented in the application whereas the EPA utilised information from the supporting documents submitted as well as the application to evaluate the project.

The EAB therefore upholds the decision of the EPA that **no ESIA is required** for the Project with the condition that appropriate permitting conditions be applied to ensure the concerns

expressed are addressed and to ensure all relevant environmental and social safeguards are in place.

Further, the EAB recommends the following actions be taken:

1. **Gas Leak Integrity Management Plan** - The permit being sought typically addresses and requires an environmental management plan including an emergency management plan. In this case, the gas leak integrity management plan will be a requirement. EPA is asked to ensure that this requirement is met.

2. **Permit Conditions** – the issues highlighted below shall be included as part of the permit conditions:

- Ambient air quality and emission levels in relation to greenhouse gases (GHGs), Sulphur dioxide (SO_2), nitrogen oxides (NOx), carbon monoxide (CO), particulate matter (PM 2.5 and PM 10), ozone, carbon monoxide, and methane be within the WHO stipulated limits.
- Prohibition of Routine flaring and venting.
- An Environmental and Social Management Plan (ESMP) be compiled for the project **pre-construction** and to include the following areas, and informed by a comprehensive stakeholder engagement program:
    - an Emergency Response Plan (ERP) with measures for its management to protect the surrounding environment and human health in emergency and non-emergency scenarios.
    - Mitigation plans for all potential impacts of the project, including those on:
        - Water quality – the relevant features such as temperature, salinity, pH, colour, transparency, oil and grease, and organic material concentration measured by total organic carbon (TOC), (COD), (BOD), turbidity measured by suspended solids (SS); sanitation-related factors determined by measuring the amount of coliform bacteria, etc.
        - Air quality
        - Solid waste management
        - Socio-cultural resources
    - Comprehensive Environmental and Social Monitoring Plan (CESMP) which shall address the construction and the operation phases separately and shall contain but may not be limited to the following:
        - A site plan or map detailing the GPS locations of final discharge point(s) for each effluent stream(s) generated, Parameters to be analyzed, Sampling locations to be monitored, Schedules for monitoring and reporting and Analytical methods

- A site map detailing the locations where emissions occur and the sampling and analytical methods to be used.
- Site plan or map detailing the GPS coordinates of sampling locations for each emission stream(s) generated, Parameters to be analyzed, Sampling locations to be monitored, Schedules for monitoring and reporting inclusive of ambient air quality, stack testing, fence-line monitoring of primary air contaminants and noise monitoring.

- Gas Leak detection and repair programme to control emissions by monitoring and implementing repairs immediately.

- The Engineering Procurement and Construction (EPC) contractor shall be required to prepare and submit an environmental, health and safety action plan (EHSAP).

- Establishment of an Occupational Health and Safety (OSH)/ Environmental Department with suitably qualified and competent employees to implement and coordinate all safety requirements, and terms and conditions stipulated in this Permit, as well as compliance monitoring with the preparation of all required reports; and act as direct liaison with the Agency for all matters relating to compliance and monitoring.

Ms. Shareefah Parks
Secretary
Environment Assessment Board

Enclosed:

- EPA public Notice of its decision dated the 6th day of January 2023; and
- EAB public notice for the hearing dated the 5th day of March 2023.

CC:

- Appellants; and
- Developer: - The Guyana Power & Gas Inc.