MINISTER

FORESTRY, FISHERIES AND THE ENVIRONMENT

REPUBLIC OF SOUTH AFRICA

Reference: LSA 234604

APPEAL DECISION

APPEALS LODGED AGAINST THE DECISION OF THE DEPARTMENT OF MINERAL RESOURCES AND ENERGY TO GRANT AN INTEGRATED ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED TETRA 4 CLUSTER 2 VIRGINIA GAS PRODUCTION PROJECT ACTIVITIES, IN FREE STATE PROVINCE

Tetra 4 (Pty) Ltd	Applicant
Natural Justice	First Appellant
MEJCON-SA and MACUA	Second Appellant
Department of Mineral Resources and Energy	Competent Authority

Appeals: These appeals were lodged against the decision of the Director-General: Department of the Department of Mineral Resources and Energy (the DMRE), taken on 13 July 2023, to grant an Integrated Environmental Authorisation (IEA) to Tetra 4 (Pty) Ltd (the applicant), in respect of listed activities pertaining to the proposed Tetra 4 Cluster 2 Virginia Gas Production Project activities situated within the Virginia Gas Field, in the Lejweleputswa District Municipality, Free State Province.

1. BACKGROUND AND APPEALS

1.1 The applicant was issued with a Production Right (PR) in terms of the Mineral and Petroleum Resources Development, 2002 (Act No. 28 of 2002) (MPRDA), as amended, on 20 September 2012.

1.2 The applicant intends to undertake various activities within the existing PR, ranging from drilling of up to 300 wells, construction and laying of high - and low – pressure pipelines, installation of production infrastructure such as compressors and booster stations, and construction of LNG and Helium station.

1.3 On 22 July 2022, the applicant applied to the DMRE for an IEA for listed activities pertaining to the proposed Tetra 4 Cluster 2 Virginia Gas Production Project at the abovementioned property. This application was submitted and processed in terms of the Environmental Impact Assessment Regulations, 2014 (2014 EIA Regulations), as amended, published in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended.

1.4 The applicant commissioned Environmental Impact Management Services (Pty) Ltd as an Environmental Assessment Practitioner (EAP) to undertake the full Scoping and Environmental Impact Reporting (S&EIR) process for the abovementioned IEA application.

1.5 On 10 February 2023, the EAP submitted the Environmental Impact Assessment Report (EIAr) and an Environmental Management Programme (EMPr), prepared in support of the IEA application, to the DMRE for its consideration and decision-making purposes.

1.6 Based on its evaluation of the EIAr and EMPr, the DMRE approved the application and accordingly issued an IEA to the applicant on 13 July 2023.

1.7 On 08 August 2023, the Directorate: Appeals and Legal Review (Appeals Directorate), within the Department of Forestry, Fisheries and the Environment (the Department), received two separate appeals against the decision of the DMRE to grant the IEA.

1.8 These appeals were submitted by Natural Justice (the first appellant) and Centre for Environmental Rights (CER) on behalf of MEJCON-SA and MACUA (the second appellant) (collectively referred to as the appellants), in terms of section 43(1A) of NEMA, read with regulation 4 of the 2014 National Appeal Regulations (2014 Appeal Regulations).

1.9 On 14 August 2023, the Appeals Directorate furnished the applicant and the DMRE with the appeals and they were afforded the opportunity to submit their responses and comments on the grounds of appeal contained in the consolidated Appeal Response Report (ARR), on or before 04 September 2023. However, as at 04 September 2023, no responses and comments were received from the applicant and the DMRE (competent authority (CA)).

1.10 On 14 September 2023, the applicant filed their responding statement to the appeals. The responding statement was submitted 10 days outside the prescribed timeframe and was accordingly accompanied by a request for condonation for the late filing thereof.

Applicant's Condonation Request

1.11 In motivating the condonation request, the applicant submits that the consolidated ARR is voluminous in nature, and it involves complex and technical considerations. Based on the abovementioned reasons, the applicant requests that the late filing of their responding statement be condoned.

1.12 On 14 September 2023, the appellants and the CA were furnished with a copy of the condonation request for their respective responses thereto. On 18 September 2023, both appellants objected to the applicant's request for condonation, citing, among other, that the applicant had failed to show any exceptional circumstances for its failure to comply with the timeframes of the 2014 Appeal Regulations and that such a failure may have significant consequences for the appeal process and the rights of the parties involved. Subsequently, on 06 November 2023, the Petroleum Agency of South Africa (PASA) on behalf of the DMRE indicated that they do not object to the said request.

1.13 On this aspect, I considered the legislative framework relating to applications for the condonation or extension of timeframes. Sections 47C and 47CB of NEMA prescribe that I have the legal authority, subject to explicit limits, to extend or condone a failure by a person to comply with a period in terms of NEMA or a Specific Environmental Management Act.The following applies:

1.14 Section 47C of NEMA provides as follows:

"The Minister or an MEC may extend, or condone a failure by a person to comply with a period in terms of this Act or a specific environmental management Act, except a period that binds the Minister or MEC".

1.15 Section 47CB(1) of NEMA provides that:

"The Minister may only in exceptional circumstances extend or condone a failure by a person to comply with a time period applicable to an appeal contemplated in section 43(1A), except for a time period which binds the Minister".

1.16 Section 47CB(1) of NEMA cannot be read in isolation of the remaining provisions of this section, which sets out, among other, the factors to be considered in adjudicating on the extension or condonation of time periods applicable to appeals relating to prospecting, exploration, mining or production as follows:

"(3) When considering an extension or condonation the Minister must consider the following factors

(a)The degree of lateness;

(b) a detailed explanation of the reasons for lateness;

(c) whether and to what extent that person or the Minister responsible for mineral resources will suffer prejudice if the time period is extended or failure to comply with a time period is condoned; and

(d) a detailed explanation of the merits of the application for extension or condonation.

(4) The time period may only be condoned for a maximum period equal to the time period allowed for the action which condonation is sought in terms of this Act."

1.17 Therefore, albeit that I am mindful of the fact that the legislative provisions expressly require that I give consideration to "exceptional circumstances" when determining an application for condonation in terms of section 47C of NEMA, I am advised by the Appeals Legal Advisor that based on her consideration of various case law on the matter, an application for condonation is based on a consideration of inter-related factors that are not individually decisive factors. I have been referred to the case of First National Bank v MMD Fitment Centre CC and Others [2023] ZAGPPHC 138; where the court referred to various case law, as stated below.

[15] In Melane v Sanlam Insurance Co Ltd 1962 (4) SA 531 (A) at C-F, Holmes JA stated the principle thus:

"In deciding whether sufficient cause has been shown, the basic principle is that the court has a discretion to be exercised judicially upon a consideration of all the fact and, in essence, is a matter of fairness to both sides. Among the fact usually relevant are the degree of lateness, the explanation thereof, the prospect of success, and the importance of the case. Ordinarily these facts are interrelated, they are not individually decisive, for that would be a piecemeal approach incompatible with a true discretion..."

[16] In Foster v Stewart Scott Inc. (1997) 18 ILJ 367 (LAC) at para 369, Froneman J stated the principle in the following terms:

"It is well settled that in considering applications for condonation the court has a discretion, to be exercised judicially upon a consideration of all the fact. Relevant considerations may include the degree of non-compliance with rules, the explanation thereof, the prospect of success on appeal, the importance of the case, the respondent's interest in the finality of the judgment, the convenience of the court, and the avoidance of unnecessary delay in the administration of justice, but the list is not exhaustive. These factors are not individually decisive but are interrelated and must be weighed one against the other. A slight delay and a good explanation for the delay may help to compensate for prospect of success which are not strong. Conversely, very good prospect of success on appeal may compensate for an otherwise perhaps inadequate explanation and long delay. See, in general, Erasmus Superior Court Practice at 360- 399A."

[17] While the factors for consideration in a condonation application are inter-related, a reasonable explanation for the delay coupled with a good prospect of success may enhance the chances of the success of the application for condonation; a weak explanation, but good

prospect of success and the importance of the case will allow for the granting of an application for condonation. The court is clothed with wide discretionary powers which it exercises judicially in the valuation of the relevant factors in the particular matter. The interests of justice underpin the court's exercise of its discretionary powers. A good explanation without prospect of success on the merits warrants a refusal of condonation.

[18] The court may grant condonation despite a poor explanation of the delay where doing so will be in the interests of justice. This will be the situation where an appellant seeks an erroneous judgment and order set aside but had failed to comply with the time frames provided for the lodging and prosecution of the appeal. The interests of justice will necessitate the granting of the condonation in order for the court to set aside the impugned judgment and orders.

[19] The absence of prejudice on the other party is also a factor considered, particularly where the prejudice may not be cured by an order of costs. In National Union of Mine Workers v Council for Mineral Technology [1998] ZALAC at 211 0- 212 at para 10, the court stated the legal position thus:

"The approach is that the court has a discretion, to be exercised judicially upon a consideration of all the fact, and in essence, it is a matter of fairness to both parties. Among the facts usually relevant are the degrees of lateness, the explanation therefore, the prospect of success and the importance of the case. These facts are interrelated, they are not individually decisive. What is needed is an objective conspectus of all the facts. A slight delay and a good explanation may help to compensate for prospects of success which are not strong. The importance of the issue and strong prospect of success may tend to compensate for a long delay. There is a further principle which is applied and that is that without a reasonable and acceptable explanation for delay, the prospects of success are immaterial, and without prospect of success, no matter how good the explanation for the delay, an application for condonation should be refused."

1.18 Having duly considered the reasoning advanced by the applicant in their condonation request, as well as the appellants' responses thereto, I am of the view that a proper case has been made for granting of the request for condonation in this matter. My reasons are as follows:

1.18.1 Regarding the degree of lateness, I took into consideration that the applicant's response to the appeals was due on 04 September 2023. However, the applicant submitted its response to the appeals a mere 10 days later, on 14 September 2023. In my view, this is not an extensive delay. Furthermore, the delay is within the parameters of section 47CB (4) of NEMA quoted above, in that it does not exceed *"the time period allowed for the action which condonation is sought in terms of this Act."*

1.18.2 On the aspect relating to the *explanation for lateness* I am aware that mining and mining and related appeals are generally complex in nature. Moreover, the appellants raise extensive grounds of appeal that are voluminous, technical and legally complex. I therefore find merit in the applicant's explanation for the delay.

1.18.3 I have also considered the aspect of prejudice and I find that the applicant will be prejudiced if its responses to the grounds of appeals are not considered, whereas I see no prejudice to the appellants if the condonation in granted.

1.18.4 Moreover, it is imperative that I consider the arguments of all the parties to the matter to assist me to arrive at the correct decision. It is therefore in the interest of justice that I have regard to the applicant's submissions.

1.19 In light of the above, I proceed to grant the applicant's application for condonation and the applicant's responses to the grounds of appeals will thus be considered in my determination of this appeal.

1.20 On 20 November 2023, the DMRE submitted its comments to the grounds of appeal. I note with concern that although these comments were submitted outside of the regulated timeframes, the CA did not request condonation for the late filing thereof. I am accordingly precluded from considering these comments in my determination of these appeals, as they fall outside of the regulated appeal process. I have therefore not referred to these comments in my appeal decision. Considering my view expressed in the preceding paragraph on the importance of arriving at the correct decision by having regard to the submissions of all parties, I must record my disapproval at the DMRE's indifferent and laissez-faire approach to this appeal.

1.21 The appeals are premised on the following grounds:

1.21.1 Failure to adequately consider the impacts that the exploration activities, which will result in unacceptable significant impacts on the environment that cannot be effectively mitigated in contravention of NEMA requirement to ensure that the activity's potential environmental impacts are properly assessed;

1.21.2 The ESIA fails to consider that prospective site is in a hotspot of climate change induced water scarcity intensification;

1.21.3 The failure to adequately assess the negative socio-economic impacts in the granting of the EA;

1.21.4 A flawed and misguided need and desirability assessment;

1.21.5 Failure to engage in meaningful consultation;

1.21.6 Failure to provide adequate reasons for the decision;and

1.21.7 South Africa currently does not have the resources to monitor and enforce compliance at gas operations.

2. GROUNDS OF APPEAL, RESPONSES, COMMENTS AND EVALUATION

First Ground of Appeal: Failure to adequately consider the impacts of exploration

2.1 The first appellant submits that:

2.1.1 The well-documented negative impacts of gas exploration and production must be carefully considered. The importance of the Strategic Environmental Assessment (SEA) conducted by CSIR, SANBI, and the Council for Geoscience for numerous government departments and agencies, including the DMRE, from 2015 to 2017. Specifically, the appellant draws attention to the cumulative risks identified in the "Scientific Assessment of the Opportunities and Risks: A Summary for Policy Makers, 2nd Edition" published in 2017.

Air pollution and Greenhouse Gas Emissions as serious impacts.

2.1.2 Oil and gas drilling operations generate quite significant levels of air pollution. The oil and gas extraction industry leads all other natural resource extraction industries in the total volume of air emissions each year.

2.1.3 The primary sources of air emissions (both continuous and intermittent) arising from the full life cycle of onshore activities consist of various factors. These include combustion sources used for power and heat generation, as well as the utilization of compressors, pumps, and reciprocating engines (such as boilers and turbines) found in onshore facilities, along with their support equipment like trucks, cranes, and dozers.

2.1.4 Other contributors are emissions resulting from the flaring and venting of hydrocarbons, as well as intermittent emissions like well-testing emissions, safety flaring, and engine exhaust, in addition to fugitive and diffuse emissions.

2.1.5 In addition, the loss of natural gas (as a greenhouse gas contributor) to atmosphere during production and distribution, should be taken into account when the relative environmental merits of petroleum and natural gas are compared. This includes taking into account the entire full lifecycle of the oil and gas exploration and production operations, in which atmospheric emissions pose a significant concern. This is particularly relevant within exploratory well drilling. The risks posed by these emissions stem from a variety of sources, such as the persistent or intermittent burning of associated gas and excessive hydrocarbon volumes during well testing and development. Furthermore, continuous flaring is utilized to eradicate gas from storage tanks and pressure-control systems.

2.1.6 Statistically, 0.5-1% of exploratory wells result in blowout, causing harmful emissions. Additionally, pressurised contents of a geologic formation literally explode out of the new well, severely impacting environment and the project economics. The effects on human and animal health from flaring of gasses are also significant. Flaring occurs when gas is burned off to test a well's potential, to deal with a well malfunction, or to separate gas from oil deposits.

2.1.7 Research shows emissions from flaring contain more than 250 toxic compounds. These pollutants can travel 300 kilometers downwind, where they can affect the health of people and animals far away from the drilling site. These incidences, however, pose a special risk to the

environment because of the hazardous nature of methane, the primary ingredient of natural gas. As opposed to the ocean environment, during a land-based blowout, methane will quickly disperse in the atmosphere, but a prolonged leak can still produce both acute and chronic poisoning of living organisms exposed in that atmosphere.

2.1.8 Additionally, atmospheric emissions arise from the combustion of gaseous and liquid fuels in energy units, which consist of diesel-powered generators, pumps, gas turbines, and internal combustion engines situated on platforms as well as onshore facilities. Moreover, the evaporation or venting of hydrocarbons during numerous operations – including production, treatment, transportation, and storage – contributes to these emissions.

2.1.9 The planned Cluster 2 expansion involves adding up to 300 new production wells and 400 exploratory wells, it is very likely that cluster 2 would take the project from pilot-scale production of thirteen gas and helium wells to as many as 300 hundred wells producing up to 45 million cubic feet of natural gas per day across many thousands of hectares in the heart of South Africa's breadbasket.

2.1.10 It is therefore imperative that the specialist air quality assessment should have established and quantified the annual aggregate greenhouse gas emissions from all facilities and onshore support activities across the entire full life cycle of the intended project in accordance with internationally recognized methodologies. This would have enabled the development of appropriate measures to reduce air emissions by selecting cost effective and technically feasible options for limiting or preventing emissions. Therefore all reasonable attempts should be made to implement appropriate methods for controlling and reducing fugitive emissions within the design, operation, and maintenance of onshore facilities within the context of exploration and production, paying particular attention to evaluating the appropriate methods and technically feasible options for controlling, minimizing or preventing fugitive emissions within the design, operation and maintenance of the full life cycle of the wells and its accompanying facilities.

2.1.11 Page 7 of the Air Quality Assessment Impact Assessment (AQIA) indicates that only routine emissions for the operational phase were estimated and simulated and that the issue of risks associated to flaring were only evaluated through modelling at the plant, with no consideration

of the risk of emissions from flaring examined at the wells. This suggests as confirmed in the assumptions and limitations, section 1.5, that emissions throughout the planning, design, decommissioning, closure and rehabilitation phases were not quantified and evaluated. As a result, the specialist study concluded that air quality impacts though being found to be a medium significance, subsequent mitigation measures render impact significance as low.

Deficiencies and limitations identified in the proposed mitigation measures for addressing air quality impacts

2.1.12 Some of the deficiencies and limitations that can be identified in the proposed mitigation measures and the assessment are as follows:

- Limited Leak Detection and Repair (LDAR) Program Scope: The LDAR program is suggested, but it lacks details on the extent of coverage and the frequency of inspections. Without a comprehensive program, the effectiveness of mitigating fugitive methane emissions may be compromised.
- Inadequate Monitoring and Reporting: While regular checks are recommended, the frequency is loosely defined as "monthly or quarterly." The absence of specific monitoring requirements might hinder timely detection and response to potential issues.
- Absence of Comprehensive Emissions Estimation: The assessment mentions estimating and simulating routine emissions during the operational phase but neglects to account for non-routine conditions within the EIAr and the EMPr, which could potentially lead to significant emissions not being factored into its modelling. This incomplete assessment may underestimate the overall environmental impact posed by the full life cycle of the project.

Limitations and deficiencies in the air quality impact assessments

2.1.13 These are concerns regarding the approach to the assessment of the impacts evaluated within the AQIA:

- Limited Scope of Flaring Assessment: The assessment focuses only on flaring at the plant and omits consideration of well flaring. Flaring is a significant source of emissions, and excluding well flaring from the evaluation may result in an inaccurate representation of the environmental impact.

- Non-Quantification of Planning and Design Phase Impacts: By not quantifying the impacts during the planning and design phases, potential emissions and environmental consequences might be overlooked. Early-stage decisions can have far-reaching effects on overall emissions and should be accounted for within the assessment.
- Ambiguity in Vapor Recovery System Implementation: The assessment suggests the consideration of vapor recovery systems for storage tanks and applicable units but does not specify the extent or mandatory requirement for such systems. The lack of clarity might impede effective implementation and subsequent VOC emissions control.
- Insufficient Dustfall Sampling Strategy: The proposed amendment to the air quality monitoring program regarding dustfall sampling lacks a clear rationale or methodology for selecting the main wind directions for sampling. This could result in an inadequate representation of cumulative deposition rates.

2.1.14 To ensure a more robust assessment of air quality impacts, improved, specific and comprehensive mitigation measures are necessary to safeguard the environment throughout the project's life cycle. The proposed mitigation measures are not comprehensive, and underestimate the overall environmental impact posed by the project. This is clear on the basis that the assessment has not adequately considered all potential sources of GHG and harmful pollutants and their environmental impacts across the entire life cycle of the development within its different phases.

2.1.15 Proper monitoring, quantification, and clarity in implementing mitigation strategies that are specific and which ensure timely detection and response to potential risks, contribute to a more effective and environmentally responsible approach to managing air pollution and Greenhouse Gas Emissions.

2.1.16 The DG's decision to authorize the Final EIA report (FEIAr) and the EMPr appears to have accepted proposed mitigation measures that do not comprehensively address all potential sources of greenhouse gases (GHG) and harmful pollutants. The failure has not taken into account all potential emissions sources across the project's life cycle and therefore undermines the decision maker's ability to ensure effective mitigation of air quality concerns.

2.1.17 The DG's reasons for decision appear to primarily focus on evaluating the routine emissions during operational phases, failing to factor in non-routine conditions that could result in significant emissions. By overlooking the non-routine emissions, the decision to authorize overlooks the potential environmental impact and fails to comprehensively consider air quality impacts throughout the project's life cycle.

Water Contamination through spills and leaks as serious impacts

2.1.18 A well-designed and well-maintained well is crucial for managing the environmental risks associated with oil and gas exploration, development, and production. Inadequate well integrity can pose a significant threat to both people's health and safety, as well as the environment. Contamination in an aquifer is most likely to occur when there is a failure in well integrity. Meticulous attention to well design and ongoing evaluation of its integrity are indispensable in safeguarding groundwater quality throughout a well's life cycle – this plays a pivotal role in minimizing the risks related to well development processes.

2.1.19 The consequences of oil and gas exploration can be quite significant if contaminants seep into community drinking water sources. This can directly impact human health and well-being. Moreover, sediments discharged from these industries such as discharges from drill cuttings, drilling mud and produced fluids may diminish the efficacy of water treatment processes, making it even harder to obtain pure and safe drinking water. The health repercussions linked to chemical contamination should not be taken lightly.

2.1.20 Long-term exposure to low concentrations can cause severe health issues over time, while even a single incident involving high concentrations – such as an accidental spill – could have immediate and potentially disastrous effects on human health.

2.1.21 Studies have shown that gas wells leak, allowing for the migration of natural gas and possibly other harmful substances into groundwater and/or the atmosphere. Studies have also shown that five percent of wells typically leak immediately upon construction, with this figure jumping to 50 percent after a mere 15 years, and an alarming 60 percent after 30 years. The well drilling process itself can cause seismic stress underground, opening pathways for fluid migration which in turn can interact with additional pathways created during the drilling of other

neighbouring wells, degradation of cement in aging well casings or earthquakes from induced seismicity. Ultimately the risk remains high for these scenarios to all contribute to the potential contamination of groundwater and increased atmospheric emissions.

2.1.22 The environmental threats associated with leaks and spills are the same as those for routine discharge of drilling wastes and produced waters. The peril posed by natural gas leaks cannot be overstated, as they pose a significant threat regardless of where they occur.

2.1.23 Natural gas is an intensely combustible substance. Consequently, every single occurrence of a natural gas leak harbours the potential for destructive fires and devastating explosions until the situation is brought under control.

2.1.24 In addition to these hazards, onshore drilling blowouts introduce another layer of risk with the possible release of toxic hydrogen sulphide. Astoundingly, a blowout transpires in 7 out of every 1000 exploratory wells. When such an event takes place, the highly pressurized contents from geologic formations violently burst forth from the freshly drilled well, indiscriminately dispersing those contents into the surrounding environment.

2.1.25 In instances where the blowout intersects with a sour gas pocket, an unregulated and hazardous release of hydrogen will ensue. This occurrence proves especially dangerous when it transpires on land, as it significantly amplifies the probability of adverse human health consequences. The extraordinary pressure behind these incidents is predominantly encountered during exploratory drilling in untapped fields.

2.1.26 The potable aquifer underlying the project area is a shallow aquifer that is intergranular, meaning that water is capable of flowing between soil particles and fractured rock. Whilst this aquifer system can recharge without much lag after rainfall, the connectivity of soil particles and fractured rock render the aquifer susceptible to contamination from surface runoff and spills, as well as exploratory well drilling for oil and gas reserves. It is therefore necessary for the Competent Authority to have taken into consideration the extent to the presence of which hazardous materials within the target area could migrate along fractures caused by well drilling into the potable aquifer.

2.1.27 The groundwater impact assessment admits to key knowledge gaps that make it difficult to properly assess how likely it is that deep saline water could migrate into the shallow, potable aquifer. On its estimate of contaminant migration rates, the specialist report notes that *"[i]t does however not take into account all known or suspected zones in the aquifer like preferential flow paths formed by faults and fracture zones or igneous contact zones like the intrusive dykes that have higher transmissivities than the general aquifer matrix. Such structures may cause flow velocities to increase several meters or even tens of meters per year under steady state conditions. Under stressed conditions such as at groundwater abstraction areas the seepage velocities could increase another order of magnitude."*

2.1.28 Information about geologic features that could be preferential flow paths for contaminants or deep saline water is critical to accurately predict how likely contamination of the potable aquifer would be given the placement of exploration and production wells. The applicant did not have or use this information in the groundwater impacts assessment, these risks are minimised in the IWWMP.

2.1.29 Given that the Cluster 2 expansion could result in 400 test wells and up to 300 production wells in the study area, the absence of detailed knowledge about fault locations, directions, and potential flow paths leads to incalculable risk that failed well casings could contaminate the shallow aquifers and boreholes used for residential and agricultural uses.

2.1.30 The water in these deep fractured aquifers associated with the Ventersdorp and Witwatersrand Supergroup formations is naturally highly saline due to their marine depositional history, as was indicated by several borehole water samples in the applicant's geohydrology impacts specialist report. There is also the potential that the deep aquifer contains uranium or radium, as is common in similar geologic formations that formed in marine depositional settings and contain hydrocarbons. Studies have shown that the Witwatersrand formation is known to contain significant uranium deposits and the studies which have reported long-documented uranium contamination occurring near mine tailing ponds in the Witwatersrand Basin with measurable uranium detectable in human hair.

2.1.31 Drilling fluids and cuttings waste produced during the exploratory well drilling phase, are also contaminants to water resources in the project area which deserve special attention due to

quantity and the pollutants they carry. The volume of drilling waste usually ranges from 1,000 to 5,000 m^3 for each well. Such wells can number into dozens for one production platform and many hundreds for a large field. Drilling muds, primarily composed of cuttings and muds, are the most substantial discharge during exploratory drilling. The drilling fluids circulated through the well hole contain toxic materials (including oil/grease, arsenic, chromium, cadmium, lead, mercury, and naturally occurring radioactive materials).

2.1.32 In addition to drilling fluids and cuttings waste contributing to potential contamination of the water sources in the project area, produced water during the production operations threatens to contaminate the deeper aquifer system underlying the project area particularly the area associated with the Ventersdorp and Witwatersrand Supergroup formations. Recent studies have revealed that produced waters frequently contain naturally occurring radioactive elements such as radium-226 and radium-228. All of these waters usually polluted by oil, inorganic salts, and trace metals vary in composition between oil fields and can be difficult to predict. Produced waters potentially impacting the surface or groundwater are typically disposed of in a deep aquifer, but there is still the threat of accidental release through leaks and spills from temporary storage, which can cause surface water, groundwater and aquifer contaminations.

Limitations and deficiencies in the geohydrology impact assessment

2.1.33 Despite the fact that studies have shown that produced waters resulting from exploratory well drilling in deep aquifer systems contain radioactive elements such as uranium and radium, the prospect of encountering the presence of these hazardous elements within the process of drilling has not been adequately evaluated within the proponent's geohydrology specialist study. No radium measurements or radioactivity measurements were made within the evaluation of risk. Only three measurements of dissolved uranium in groundwater were made, and their formation origin was not verified. Well drilling will likely result in produced water containing these radioactive elements, which subject to a spill or leak will most likely lead to a contamination of the shallow potable water aquifer.

2.1.34 The increase of spillage of drilling muds, produced water and other contaminants significantly increases when the integrity of well casings is compromised from sub-par sealing and capping. Attempts to seal wells by using steel casing and cement grouting are not perfect and have been

known to fail. Casings can collapse or leak, allowing gas and formation water to freely migrate along the path of least resistance. This has been documented in regions of the US with hydraulic fracturing, where methane found in drinking water wells was determined to likely originate from either faulty or inadequate steel casings of gas wells or imperfections in the cement designed to seal gaps between casings and rock. These gaps prevent fluids from moving up the outside of the well, a process known as grouting.

2.1.35 In the event of well casing or cementation failure, stray gas and saline formation water (also called brine) is expected to preferentially move into the fracture zone from which the gas is extracted. These concerns render it vital that abandoned exploratory and production wells are properly constructed, maintained, cased, and adequately monitored throughout the lifetime of the well and beyond. The production phase of the proposed project is just 20 years, but the deep ruptures to the geology and hydrogeology of the formation would be permanently in place. Given that the Cluster 2 expansion could result in 400 test wells and up to 300 production wells in the study area, the absence of detailed knowledge about fault locations, directions, and potential flow paths leads to incalculable risk that failed well casings could contaminate the shallow aquifers and boreholes used for residential and agricultural uses.

2.1.36 The steel casing and cement seals in many gas wells undergo mechanical and/or chemical failure in the long term. These failures result from poor well completion practices, corrosion of steel casing and/or the deterioration of cement during and after gas production. In the event of a casing failure, the well can become a high-permeability conduit for brine and stray gas from deep formations to the overlying shallow Karoo aquifers. While the lifespans of cement and steel well casings are estimated to be 75 – 110 years, it has been found that more than 50% wells 15 years old or older have at least one section of cement casing with compromised integrity.

2.1.37 The risks to water and human health must be considered with the best possible contamination predictions, and the applicant should have included in its assessment the preferential flow paths of contaminant and saline water along faults and fissures. Regarding well casing failure rates, these risks should also be considered beyond the 20-year timeframe of the proposed project and in line with predictions of increased future water stress. Groundwater is likely to become

even more of a vital water source in the area with climate stressors on surface water, and its protection is critical to liveability in the Free State.

2.2 The second appellant submits that:

2.2.1 The Final EIAr (FEIAr) and DMRE failed to adequately consider the groundwater impacts of the Project, and therefore have failed to meet the requirements of, inter alia, section 24O(1) NEMA1 to account for all relevant factors, in particular those regarding the pollution, environmental impacts or environmental degradation *"likely to be caused if the application is approved"*, as well as any guidelines, departmental policies, and environmental management instruments and any other information in the possession of the competent authority relevant to the Application. This is also in contravention of the NEMA requirement to ensure that the activity's potential environmental impacts are properly assessed.

2.2.2 Based on the FEIAr, the DMRE concluded that *"All fundamental and procedural requirements prescribed in the applicable legislation is satisfied. Potential impacts on ... groundwater contamination will be of medium significance prior mitigation and of low significance after mitigation."*

2.2.3 This finding, however, is based on a substantially flawed groundwater assessment that is riddled with critical data gaps and flawed analysis, thus serving to vastly underestimate the potential effects of the project on groundwater aquifers.

2.2.4 Dr. Steven Campbell, a geologist and hydrogeologist with over 30 years of experience on wide range of projects and issues globally, reviewed the FEIAr and supporting technical documents, and identifies substantial gaps and flaws in these documents. The report thereof is marked and appended as Annexure "A1".

2.2.5 Dr. Campbell notes that he is *"astonished at how little basic site-specific geology and hydrogeology has been employed to establish the geologic framework that hosts critical groundwater resources (i.e., aquifers)."* He concludes: "*Considering all of the issues and concerns identified in this Expert Report, I opine that Tetra4's current plan to dramatically expand their gas production field should not be approved unless and until the identified data*

gaps are filled so that regulatory agencies can adequately determine the safety of, and risks posed by, Tetra4's proposed plan."

2.2.6 Dr. Campbell opines that very little basic site-specific geology and hydrogeology was employed to establish the geologic framework that hosts critical groundwater resources (i.e., aquifers). Data that was undoubtedly obtained during installation of Cluster 1 exploratory and production gas wells were conspicuously absent throughout the FEIAr. Further. Dr. Campbell concludes that Tetra4's heavy reliance on unevenly distributed active and inactive water supply wells (WSWs) of largely unknown construction to serve as "monitoring" wells was inappropriate for evaluating "baseline" water quality.

2.2.7 The applicant employed water level measurements from those same "monitoring" wells to construct a computer groundwater-flow model of the Cluster 2 area 9. Tetra4's computer simulations of groundwater flow and contaminant transport are central to its claims to identify minimal risks posed by groundwater contaminants introduced by natural gas production wells and surface infrastructure. But according to Dr. Campbell, that model completely disregards the complex nature of fractured-rock aquifers, thus rendering the model's hydrogeologic framework dubious. Dr. Campbell opines:

"Tetra4's computer model of the Karoo aquifer is at best suspect and that simulated contamination scenarios are inherently compromised. Tetra4'a model of the Karoo's groundwater system is constructed by employing many assumptions and sparse site-specific data. The model domain (boundary) is extremely large (~235,000 hectare) relative to the Cluster 2 study area (

The model employs hydraulic-head measurements made at the 2022 hydrocensus wells (only ~15% of the domain's area), so most of the model domain (~85%) has no field-measured head data to constrain the spatial distribution of groundwater and corresponding patterns of flow. Thus, I opine that much of Tetra4's computer model has little or no basis in the real world."

2.2.8 Based on these issues, Dr. Campbell is of the opinion that *".. prior to regulatory plan approval, Tetra4 should address data gaps and associated flaws in their computer modelling and contamination simulations in order to provide reliable forecasting of no impacts to groundwater resource abundance and water quality, specify a much more robust monitoring-well network*

and groundwater monitoring plan, and formulate specific groundwater mitigation and remediation plans."

2.2.9 The above-mentioned flaws demonstrate that the potential impacts of the projects could be much more substantial than what the FEIAr estimates before and after mitigation. As the limited hydrocensus undertaken by the applicant's groundwater specialist demonstrates, the shallow aquifer is used for a variety of purposes, including for livestock and drinking water. Thus, it is critical to have an accurate understanding of the potential effects of the project on this aquifer system.

2.2.10 In summary, the major gaps and flaws of the groundwater impact assessment would need to have been filled before the decision to grant the EA could properly and lawfully have been taken. In addition, the EA approval was inconsistent with the requirements section 6(2) of the Promotion of Administrative Justice Act, Act 03 of 2000 (PAJA), because the decisionmaker failed to take into account "relevant considerations"; the action contravenes NEMA; and because the decision is unreasonable. For this reason, the EA should be set aside.

Applicant's Response

2.3 In response to the first appellant's submissions, the applicant contends that:

2.3.1 The first appellant incorrectly refers to '*exploration activities*.' The EA in question relates to '*production activities*' governed under an existing lawful Production Right which includes amongst other, exploration activities. The first appellant provides generalized statements which will become evident in the ensuing averments.

2.3.2 The first appellant refers to a SEA in which the assessment was for shale gas development utilising hydraulic fracturing. The environmental impacts associated with hydraulic fracturing are different from those being applied for by Tetra4 in the production activities. No hydraulic fracturing or any form of well stimulation is to be undertaken.

2.3.3 Whilst the first appellant has provided a generalised statement regarding the oil and gas industry, this EA application has taken consideration of air quality and climate change impacts through the commissioning of detailed operational specific independent specialist studies. Air

Quality and Climate Change specialist reports are contained in Appendix 4 of the FEIAr. The project specific impacts were quantified, assessed and relevant mitigation measures provided. A detailed impact assessment of air quality and climate change impacts was presented in Section 10.2 of the FEIAr.

2.3.4 The Climate Change Assessment (CCA) considered the Scope 1, 2 and 3 emission sources during the various phases of the project and accordingly covered the full lifecycle of the project. Refer to a description of the emissions in Section 9.14 of the FEIAr and the climate change impact assessment in Section 10 of the FEIAr. The CCA report is included in Appendix 4 of the FEIAr.

2.3.5 Climate change is a pressing threat globally; however, it is worth noting that whilst the first appellant refers to the oil and gas sector posing "significant concerns" to atmospheric emissions, South Africa's contribution to the global GHG emissions (as per the IPCCC) represents ~1% of the global inventory. Fugitive emissions, flaring and CO_2 venting were considered in the CCA report (refer to Appendix 4 of the FEIAr) and the emission factors are provided in Appendix A of the CCA. It is important to bear in mind that the exploratory drilling programme is scheduled to take approximately 3 years and thereafter full production phase is achieved.

2.3.6 The statistics provided by the first appellant apply to confined reservoirs under high pressure whereas the gas pressure in the Virginia gas field is extremely low owing to the non-confined reservoir with the gas flowing passively out of the wells at ~0.4 barg (refer to Section 4.1.2 of the FEIAr). Although uncommon, blowout or blowback of water and/or gas is prevented using a blowout diverter which is installed in the drill line (on surface) and the blowout diverter valves safely redirect any water and/or gas to a discharge line for safe disposal (refer to Section 4.1.3.1 of the FEIAr).

2.3.7 The first appellant provides generalized statements with regard to oil and gas sector activities, emissions, etc.; however, it should be noted that fugitive emissions, flaring and CO2 venting for this specific project were considered in the CCA report (refer to Appendix 4 of the FEIAr).

2.3.8 The area of influence as modelled and determined by the AQIA for the well construction sites is 750m from sensitive receptors (refer to Table 39 of the Air Quality Assessment report contained in Appendix 4 of the FEIAr). This modelled area of influence is markedly smaller owing to site specific and project specific conditions than the Appellant's claimed 300km.

2.3.9 As per the response to Item 3 above, the Climate Change Assessment (CCA) considered the Scope 1, 2 and 3 emission sources during the various phases of the project. Refer to a description of the emissions in Section 9.14 of the FEIAr and the climate change impact assessment in Section 10 of the FEIAr. The CCIA report is included in Appendix 4 of the FEIAr.

2.3.10 A detailed project description is provided in Section 4.1 of the FEIAr and the assessment of the impact of the project on agriculture is provided in Section 10.2 of the FEIAr. What sets this project apart from others is that this project can co-exist with existing land use and will therefore not result in the sterilization of agricultural resources.

2.3.11 Besides the drilling phase, upstream emissions of the Cluster 2 project including transport and power generation was included in the CCIA. Scope 1, 2 and 3 emissions were factored into the assessment. Therefore, the full life-cycle assessment was undertaken. A description of the emissions and the climate change impact assessment were provided in Section 9.14 and Section 10 of the FEIAr, respectively. The CCA report is included in Appendix 4 of the FEIAr. Relevant management and mitigation measures were identified and included in the FEIAr and EMPr. The CCIA took into account the IFC literature on GHGs, various international agreements as well as the Global GHG Emissions Inventory while further considering South Africa's status in terms of climate change and quantification of GHGs in terms of the Paris Agreement, National Climate Change Response Policy, GHG Emissions Reporting requirements, the National GHG emissions inventory and the draft National Guideline for Consideration of Climate Change in Development Applications (refer to Section 2 of the CCA specialist report). The designs for this project shall be developed taking into account international best practice and will therefore provide adequate methods for identification, controlling and reducing fugitive emissions.

2.3.12 The AQIA estimated and simulated both routine and upset conditions from the flare at the plant (Sections 4.1.3.33 and Table 21 provide the quantified emissions from the flare, with the

impacts discussed under Section 4.3.2. and Section 4.3.22 for "Emergency or Upset condition"). Emissions from flaring at the wells could not be assessed since these would occur intermittently and not at all the wells simultaneously, with the temporal and spatial variations not known. Furthermore, not all wells would be flared. Based on the modelled results from the "Emergency or Upset condition" at the plant, the expected impacts from flaring at the wells are likely to be within the relevant air quality standards except for VOCs (which might exceed the hourly TCEQ), but these impacts are expected to fall within the separation distance and will be of short duration.

2.3.13 The first appellant's attention should be drawn to the fact that the EIAr they reference from the DFC website is not the final version submitted to the CA for decision making. The LDAR is a requirement of the Atmospheric Emissions License (AEL) and further detail on the frequency of inspections will be included in the AEL. The detailed LDAR would be a function of the final designs which are still in development.

2.3.14 The frequency of regular checks will be defined in the AEL.

2.3.15 The frequency of upset conditions cannot be quantified as the development has yet to commence and can thus be either over or underestimated resulting in greater uncertainty in the emissions model.

2.3.16 The frequency of upset conditions cannot be quantified as the development has yet to commence and can thus be either over or underestimated resulting in greater uncertainty in the emissions model. Emissions from flaring at the wells could not be assessed since these would occur intermittently and not at all the wells simultaneously, with the temporal and spatial variations not known. Furthermore, not all wells would be flared. Based on the modelled results from the "Emergency or Upset condition" at the plant, the expected impacts from flaring at the wells are likely to be within the relevant air quality standards except for VOCs (which might exceed the hourly TCEQ), but these impacts are expected to fall within the separation distance and will be of short duration.

2.3.17 It is highly unlikely that the Planning and Design Phase would result in higher GHG emissions than the Construction Phase.

2.3.18 The mandatory requirements for vapour recovery will be defined in the AEL. The proponent will have to provide evidence of the effectiveness of these measures under the AEL.

2.3.19 The wind roses are presented in the AQIA (Section 3.2.2). During the 2019 to 2021 period, the wind field was dominated by winds from the north-northeast and northeast, followed by northerly and easterly winds. Fugitive particulate emissions due to the construction of roads, pipelines, wells, booster and compressor stations and the Cluster 2 plant were calculated using an area wide average particulate generation emission factor (US EPA AP-42, Section 13.2.3, "Heavy Construction Operations", US EPA 2004). Modelled results from both the construction and operational phases indicated air quality health and nuisance impacts at the nearest residential receptors to be of medium significance without mitigation and low significance with mitigation. Mitigation measures are presented in Section 6.1 of the Air Quality Impact Assessment as well as the EMPr. The dustfall is expected to be low, hence the motivation to conduct dustfall sampling in the four main wind directions.

2.3.20 It is agreed that the Leak Detection and Repair (LDAR) program must include specific details, and this needs to be approved by licensing authority, per the AEL requirements. LDAR is dependent on the final designs which are yet to be completed and the AEL requirements would feed into the basis of design of the LDAR.

2.3.21 The frequency of monitoring will be defined in the AEL requirements.

2.3.22 The frequency of upset conditions cannot be quantified as the development has yet to commence and can thus be either over or underestimated.

2.3.23 It is agreed that monitoring and reporting requirements for flaring should be clarified to ensure timely detection and response. This will be stipulated in the AEL.

2.3.24 It is highly unlikely that the Planning and Design Phase would result in higher emissions than the Construction Phase.

2.3.25 The mandatory requirements will be defined in the AEL. The proponent will have to provide evidence of the effectiveness of these measures under the AEL.

2.3.26 Modelled results from both the Construction and operational phases indicated air quality health and nuisance impacts at the nearest residential receptors to be of medium significance without mitigation and low significance with mitigation. The dustfall are expected to be low, hence the motivation to conduct dustfall sampling in the four main wind directions.

2.3.27 The frequency of upset conditions cannot be quantified as the development has yet to commence and can thus be either over or underestimated.

2.3.28 One of the potential impacts of the development is contamination of the shallow, intergranular aquifer caused by leakage of stray gas from the production boreholes. This impact was assessed in the EIAR (refer to Section 10.2.2.6) and it should be noted that should the mitigation and management measures as set out in the groundwater management plan be implemented and maintained potential impacts can be minimised.

2.3.29 Key mitigation measures proposed in this regard include (but not limited to):

- Daily inspections of drilling pads, pipelines, compressors and the helium plant must be implemented (Refer to Section 14.4 p 187 of the Groundwater Impact Assessment Report).
- Well design will be undertaken according to designs developed by a qualified well engineer (Refer to Section 14.4 p 187 of the Groundwater Impact Assessment Report).
- A surface casing vent flow test should be conducted to determine whether gas or liquid or a combination thereof is escaping from the casing. If gas is detected during this test, additional seals should be designed and implemented (Refer to Section 14.5 p 190 of the Groundwater Impact Assessment Report).
- Calliper Logging should be conducted to identify and investigate potential blockages/cavities within well (refer to Section 10.2.3.5 of the FEIAr).
- Cement Bond Logging should be performed to investigate the current integrity of the casing and cementation (refer to Section 10.2.3.5 of the FEIAr).
- Integrity of the plugs must be confirmed by setting weight down on the upper most plug (using the drill string) as well as a differential pressure test for 4 hours at determined

pressure with less than 10% bleed over the period. Pressure test data to be captured in 15-minute intervals for the entire 4-hour testing period (refer to Section 10.2.3.5 of the FEIAr).

2.3.30 The potential impact of the project on the regional groundwater regime is deterioration of the potable Karoo aquifer water quality as well as modification of the riparian zone primary porosity aquifer associated with alluvium material deposited in flood plains. As groundwater is often the sole water resource to the landowners and rural communities within the study area the risk and consequence of groundwater contamination is even higher. This impact was assessed in Section 10.2.2.6 of the EIAr.

2.3.31 It is important to consider the short-lived nature of drilling and then the final disposal, off-site of drilling waste (cuttings and mud) at a suitably lined facility. Most impacts stemming from this activity, historically occur because drilling waste is stored on site - which is not the case for this project. If the mitigation and management measures as set out in the groundwater management plan are implemented and maintained, potential impacts can be minimised. Key mitigation measures proposed in this regard include:

- Daily inspections of drilling pads, pipelines, compressors and the helium plant must be implemented.
- Develop and implement a stormwater management plan in accordance with GN704 to separate dirty/contact water from clean water circuits (Section 14.4 p 187 of the Groundwater Impact Assessment Report).
- All actively used drill mud sumps should be adequately lined with an appropriate barrier system to isolate and prevent seepage of contaminants from the host aquifer. Furthermore, a biodegradable polymer should be used as drilling lubricant.
- A rehabilitation plan must be developed based on site-specific issues and performed in accordance to best practice guidelines and guided by the closure and rehabilitation plans (Section 14.4 p 188 of the Groundwater Impact Assessment Report).
- Development and implementation of an integrated groundwater monitoring program evaluating hydrochemistry will serve as early warning mechanism to implement mitigation measures.
- The applicant should consider conducting a waste classification and waste hazardous study to determine health risks associated with the waste material. A project plan and

proposal for a waste classification study was submitted (Section 15 p 191 of the Groundwater Impact Assessment Report).

2.3.32 It is noted that the first appellant's referenced studies are not cited. The potential impact of the project on the regional groundwater regime is deterioration of the potable Karoo aquifer water quality as well as modification of the riparian zone primary porosity aquifer associated with alluvium material deposited in flood plains and this impact was identified and assessed in the FEIAr. As groundwater is often the sole water resource to the landowners and rural communities within the study area the risk and consequence of groundwater contamination is even higher. It should however be stated that a detailed groundwater management plan has been developed and summarised in the hydrogeological report in order to provide a guideline and framework for the applicant to identify, mitigate and minimize potential impacts of the proposed operations on sensitive environmental receptors. Should the prescribed mitigation and management measures, as stipulated in the groundwater management plan, be implemented and honoured, the impacts associated with the project phases can be minimised. Section 14.2 on page 185 of the Groundwater Impact Assessment Report provides that the management plan is enforceable and auditable by relevant authorities and must be complied with.

2.3.33 Section 15 on page 191 of the Groundwater Impact Assessment Report provides that an integrated groundwater monitoring program has been developed and will be implemented to serve as an early warning and detection mechanism for any negative quality or quantity impacts to implement mitigation measures.

2.3.34 Monitoring results must be evaluated on a quarterly basis by a suitably qualified person for interpretation and trend analysis and submitted to the Regional Head: Department of Water and Sanitation. Based on the water quality results, the monitoring network should be refined and updated every three to five years based on hydrochemical results obtained to ensure optimisation and adequacy of the proposed localities (Refer to Section 14.4 p 188 of the Groundwater Impact Assessment Report).

2.3.35 It is highly improbable that drilling activities will have a significant effect on the formation of preferred pathways acting as a mechanism for the pollution plume migration. It should however

be noted that the identified hydrogeological sensitive areas and buffer zones delineated as part of this assessment must be adhered to during the construction and operational phase activities. It is recommended that a localised hydrocensus user survey be performed within a 500.0m radius of each proposed gas production borehole situated within the riparian zone(s) and 350.0m radius of each proposed gas production borehole situated within the Karoo formations in order to identify the presence of other sensitive groundwater receptors and/or private boreholes (Refer to Section 17 p 204 of the Groundwater Impact Assessment Report). Accordingly, the gas production well design must take the results of the hydrocensus into consideration, specifically with regard to the planning and placement of boreholes as part of future drilling programmes.

2.3.36 Aeromagnetic and gravity surveys have been undertaken to identify and delineate potential lineaments.

2.3.37 Design and construction are undertaken by suitably qualified professionals and these emissions referred to are lost product so extra precaution is taken to mitigate emissions. Based on the gas composition analysis from the Cluster 1 / Phase 1 wells, no Hydrogen Sulphide was detected. Furthermore, the Virginia gas field production wells are very low pressure and consequently represent a significantly reduced blowout risk. Section 4.1.3.1 of the FEIAr provides that even though the blowout risk is very low for occurrence, blowout diverters are used to mitigate against such a risk.

2.3.38 It is highly unlikely that well drilling will have a significant contribution to potential fracture or preferred pathway formation. However, as this is a concern, mitigation and management measures to aid in minimising such events can be implemented accordingly.

2.3.39 Mitigation and management measures include:

- An integrated groundwater monitoring program has been developed and will be implemented to serve as an early warning and detection mechanism for any negative quality or quantity impacts to implement mitigation measures (Refer to Section 15 p 191 of the Groundwater Impact Assessment Report).
- Monitoring results must be evaluated on a quarterly basis by a suitably qualified person for interpretation and trend analysis and submitted to the Regional Head: Department of

Water and Sanitation. Based on the water quality results, the monitoring network should be refined and updated every three to five years based on hydrochemical results obtained to ensure optimisation and adequacy of the proposed localities (Refer to Section 14.4 p 188 of the Groundwater Impact Assessment Report).

2.3.40 It is highly unlikely that drilling activities will have a significant effect on the formation of preferred pathways acting as a mechanism for the pollution plume migration. It should however be noted that the identified hydrogeological sensitive areas and buffer zones delineated as part of this assessment must be adhered to during the construction and operational phase activities. It is recommended that a localised hydrocensus user survey be performed within a 500.0m radius of each proposed gas production borehole situated within the riparian zone(s) and 350.0m radius of each proposed gas production borehole situated within the Karoo formations in order to identify the presence of other sensitive groundwater receptors and/or private boreholes (Refer to Section 17 p 204) of the Groundwater Impact Assessment Report). Accordingly, the gas production well design must take the results of the hydrocensus into consideration, specifically with regard to the planning and placement of boreholes as part of future drilling programmes.

2.3.41 Aeromagnetic and gravity surveys have been undertaken to identify and delineate potential lineaments.

2.3.42 Where possible, known faults and fracture zones or dyke intrusions are incorporated as part of the model development and calibration process. The first appellant is correct in stating that the occurrence of such geological lineaments and/or structures will have an impact on the propagation of a potential pollution plume as the latter will serve as preferred pathways acting as a transport mechanism. It should however be stated that a numerical groundwater flow model is a simplification of the hydrogeological system, and it is impossible to include all fracture zones and/or lineament unless precise locations are known. Aeromagnetic and gravity surveys have been undertaken to identify and delineate potential lineaments. As the groundwater model is a management tool it should be updated and recalibrated on a continual basis as new site characterization information becomes available (Refer to Section 14.4 p 187 of the Groundwater Impact Assessment Report). Accordingly, updated simulations will aid in

the identification of potential high-risk areas which can be focused on as part of the monitoring program.

2.3.43 They will undertake an integrated groundwater monitoring program for the Cluster 2 development to evaluate hydrochemistry and the degree of those changes within the context of Tetra4's activities to serve as early warning mechanism to implement mitigation measures. The baseline groundwater monitoring programme being undertaken for Cluster 1 / Phase 1 indicates historical agricultural and mining impacts on the groundwater quality. Determinants for analysis include Uranium and will be updated to include Radium analysis as well (Refer to Section 15.3 p 192 of the Groundwater Impact Assessment Report). The proposed production activities do not involve the generation of gold tailings deposits or ponds.

2.3.44 As indicated in Table 7 of the FEIAr, the previous samples of drilling muds have been sampled and classified and the results indicate the material is hazardous in nature owing to certain lithologies. Mitigation measures have been put forward to ensure that this waste is adequately handled, stored and disposed of offsite at a suitably licenced hazardous waste disposal facility. The Appellant makes generalised assumptions on the volume of waste from each well. Based on previous drilling undertaken for Phase 1 (Cluster 1), the volume of drilling waste is at most 100m^3 per well and not 1,000m^3 to 5,000m^3 as per the Appellant's citation. The Appellant's attention is drawn the condition 5.5.4 of the Environmental Authorisation which states: "Drilling fluids and muds must be strictly water-based and environmentally friendly. In this regard, the holder is required to submit Material Safety Data Sheets for drilling fluids to PASA at least 60 days prior to commencement of drilling operations.

2.3.45 As stated in Section 9.10.5 of the FEIAr, it (the applicant) does not intend to undertake hydraulic fracturing, or any well stimulation and the existing dataset suggests that no dewatering of produced water will be required. Development and implementation of an integrated groundwater monitoring program evaluating hydrochemistry will serve as early warning mechanism to implement mitigation measures. Determinants for analysis include Uranium and will be updated to include Radium analysis as well as radioactivity measurements. (Refer to Section 15.3 p 192 of the Groundwater Impact Assessment Report). Please note that Tetra4 monitors for Uranium in the groundwater parameters being assessed for the ongoing Cluster 1

production project. In all samples analysed, the Uranium concentrations have been below the laboratory detection limit as well as limit for concern with human health.

2.3.46 As stated in Section 9.10.5 of the FEIAr and Section 12.7 of the Groundwater Impact Assessment Report, the applicant does not intend to undertake hydraulic fracturing, or any well stimulation and the existing dataset suggests that no dewatering of produced water will be required. All monitoring localities should be subjected to an initial comprehensive water quality analysis to evaluate hydrochemical composition and identify potentially elevated parameters going forward (Refer to Section 15.3 p 192 of the Groundwater Impact Assessment Report). There is no intention by the project to abstract large volumes of formation water. The drilling is not targeting saturated formations which would hold significant volumes of water. These are likely to only be intersected at intervals during the drilling process and are likely to only generate a small volume of formation water over a short duration. The vertical movement and mixing between different flow zones (such as the deeper aquifers and the shallow aquifers) will be limited through proper casing and cementing.

2.3.47 Numerous mitigation measures are put forward in Section 10.2.3.5 of the FEIAr to ensure that decommissioned wells are adequately sealed. These measures include but not limited to cement bond logging will be performed to investigate the integrity of the casing and cementation followed by the complete cementation of the well from the bottom to surface. The Gas Well Closure, Abandonment and Rehabilitation Guideline is included in Appendix 7 of the FEIAr which has been developed according to Best Practice Guidelines. Following closure of the wells, ongoing post-closure groundwater monitoring is to be undertaken to serve as an early warning and detection mechanism to implement further mitigation if necessary. Lastly, financial provision provides for the latent and residual risks including but not limited to well casing and/or cementation failure and subsequent redrilling and cementation of failed wells (refer to the Final Rehabilitation Decommissioning and Closure Plan included in Appendix 6 of the FEIAr).

2.3.48 The impact of groundwater deterioration and subsequent impact on third party water users was assessed in the FEIAr (refer to Table 57 in Section 10.3 of the FEIAr). A numerical groundwater flow and contaminant transport model was undertaken and is presented in Section 9.10.5 of the FEIAR). This model provides a contamination prediction on existing abstraction boreholes as identified in the hydrocensus (refer to Section 9.10.1 of the FEIAr). Mitigation measures to

address the impacts on groundwater deterioration are presented in Section 10.2.1.6, 10.2.2.6 and 10.2.3.5 of the FEIAR and these mitigation measures are included in the EMPr (Appendix 5 of the FEIAR).

2.3.49 The first appellant contends that there is an absence of detailed knowledge about fault locations, directions, and potential flow paths however a series of recent surveys determined the location of all lineaments (to the best of our knowledge and available technology allows). These surveys include aeromagnetic and gravity surveys. Thus, the risk is quantifiable. The sub-surface is not entirely unknown.

2.3.50 The deeper aquifers as a pollution source were identified and assessed in the FEIAr and relevant management and mitigation measures recommended. Furthermore, an integrated groundwater monitoring program and implementation thereof does form part of the groundwater management plan and recommendations (Refer to Section 15.3 p 192 of the Groundwater Impact Assessment Report). Continuous monitoring will serve as early warning mechanism to implement mitigation measures accordingly. Determinants for analysis include Uranium and will be updated to include Radium analysis as well. It is also recommended that time-series monitoring data be evaluated and interpreted on a bi-annual basis in order to detect increasing trends of the elements of concern (Refer to Section 14.4 p 188 of the Groundwater Impact Assessment Report). Phase 1 of this project did not indicate any elevated concentrations of the aforementioned elements and should be used as benchmark rather than other studies not necessarily representative of on-site conditions.

2.3.51 Numerous management and mitigation measures are put forward in Section 10.2.3.5 of the FEIAr to ensure that decommissioned wells are adequately sealed. These measures include but not limited to cement bond logging will be performed to investigate the integrity of the casing and cementation followed by the complete cementation of the well from the bottom to surface. The Gas Well Closure, Abandonment and Rehabilitation Guideline is included in Appendix 7 of the FEIAr which has been developed according to Best Practice Guidelines. Following closure of the wells, ongoing post-closure groundwater monitoring is to be undertaken to serve as an early warning and detection mechanism to implement further mitigation if necessary. Lastly, financial provision provides for the latent and residual risks including but not limited to well casing and/or cementation failure and subsequent redrilling and cementation of failed wells

(refer to the Final Rehabilitation Decommissioning and Closure Plan included in Appendix 6 of the FEIAr).

2.3.52 Risks associated with the proposed gas production have been identified and rated as high without mitigation. It should however be stated that it is still the opinion of the Geohydrological specialist that, should the mitigation and management measures as summarised in Section 14 p 185 – 190 of the Groundwater Impact Assessment Report be implemented, the impacts associated with the project phases can be minimised. It should again be highlighted that the groundwater management plan is enforceable and auditable by relevant authorities and must be complied to (Refer to Section 14.2 p 185 of the Groundwater Impact Assessment Report).

2.3.53 A post-closure monitoring program and network has specifically been developed and recommended in order to cater for ongoing risks in section 14.5 p 190 of the Groundwater Impact Assessment Report.

2.4 In response to the second appellant, the applicant submits that:

2.4.1 This general statement by the second appellant is factually incorrect. It is taken out of context and specifically refers to the construction phase of the project where potential impacts of associated activities are rated as low after implementation of mitigation measures. It should however be stated that the rated impact for both the operational and post-closure phases is rated as medium to high negative without implementation of remedial measures and low to medium negative with implementation of proposed mitigation measures.

2.4.2 To consider the data gaps identified as a fatal flaw is simply not correct. Data uncertainty will always form part of any investigation, however where assumptions were made or reference values used, a conservative approach was followed.

2.4.3 In terms of site-specific geology there exists numerous publications (refer to Shango, 2016) which described the geological host formations i.e., Ecca Group, Ventersdorp Supergroup as well as Witwatersrand Supergroups and its stratigraphy throughout the regional study area. Furthermore, various groundwater related maps and databases, with specific reference to the greater study area (Barnard 2000, Vegter 1995) were studied in order to establish on- site

groundwater conditions and potential aquifer units. In addition to this, in excess of 62 groundwater geosites with relevant water levels, borehole yields, borehole depths as well as groundwater application have been applied to infer local groundwater conditions.

2.4.4 The second appellant does not clarify which data is referred to as all data collected from the Cluster 1 investigation i.e., local geology and hydrogeology, structural features, aquifer hydraulic parameters, time-series monitoring data with specific reference to water levels and water quality does form part of this follow-up investigation and were applied to establish a new baseline and current hydrogeological status quo.

2.4.5 Page 196 of the Groundwater Impact Assessment Report under Section 15.0 provides the updated monitoring program and network. A total of 43 monitoring boreholes are proposed of which an excess of 20 additional monitoring points are included consisting as either new boreholes to be established or privately owned boreholes. Furthermore, of these monitoring boreholes proposed, various boreholes which are not being applied for water supply purposes are included in the monitoring network. Surely it is not practical to cover the entire study area in an evenly distributed borehole grid that is why focus was put on potential exploration hot spots with inclusion of privately used boreholes in close proximity. An additional mitigation measure to manage the distribution of monitoring boreholes is to conduct a hydrocensus user survey around each production borehole in order to identify possible boreholes not included in this monitoring network. Monitoring results should be evaluated on a quarterly basis by a suitably qualified person for interpretation and trend analysis. Based on the water quality results, the monitoring network should be refined and updated every three to five years based on hydrochemical results obtained to ensure optimisation and adequacy of the proposed localities.

2.4.6 Nowhere in the groundwater report are the identified risks classified as "minimal" and we are unsure where the second appellant's reviewer obtained this impression. The rated impact for both the operational and post-closure phases is rated as medium to high negative without implementation of remedial measures and low to medium negative with implementation of proposed mitigation measures. To state that there will be minimal risks introduced by natural gas production is incorrect and creates the impression that the Appellant's reviewer either did

not thoroughly read the report or is using extracts from the report out of context. The second appellant must provide a reference to validate this statement.

2.4.7 It should be noted that the numerical groundwater flow model was constructed and calibrated based on the National Centre for Groundwater Research and Training, (2012) as summarised in the Australian Groundwater Modelling Guidelines (2012) including Best Practice Guidelines as well as various published literature (Spitz, K. and Moreno, J., 1996. and Anderson and Woessner, 1992). To make a statement that the computer model is at best "suspect" creates the impression that the model was developed with the malicious intent of hiding the simulated output. The latter is an attack and insult on the specialist rather than a critical review on the science applied.

2.4.8 It must be emphasized that a numerical model is a mathematical simplification of the groundwater system and problem statement. It is the considered opinion of the projects Geohydrological Specialist that over-complication of a groundwater model usually necessitates more assumptions which creates an unstable and not necessarily more accurate solution/output.

2.4.9 Furthermore, it is factually incorrect by the second appellant to state that sparse site-specific data were incorporated as part of the model development and calibration. It should be stated that the model was developed and constructed with published geological and hydrogeological data/ information and calibrated with an excess of 62 boreholes, including existing monitoring data. In the opinion of the projects Geohydrological Specialist (a senior hydrogeologist with 15years experience in relevant groundwater projects) this number of geosites can be considered as being representative of on-site conditions. There will always be limitations and data gaps in any model, and which necessitates initial assumptions, however, as stated numerous times above, the data gaps identified should be addressed by a continual and ongoing data gathering process i.e., drilling data, monitoring data, geophysical data, etc. in order to update and recalibrate the initial model. By following this methodology and approach the model will continually improve and be more representative of on-site conditions.

2.4.10 The project's Geohydrological Specialist agrees that there are certain data gaps with regards to the presence of preferred pathways which should be addressed and mitigated as previously proposed, however, to view this as a fatal flaw is not the correct approach.

2.4.11 There exist no grounds in stating that the hydrocensus conducted is limited. A total number of 62 geosites were visited as part of the groundwater investigation. Further to this it is recommended that a hydrocensus be conducted in close proximity to all production boreholes in order to identify any groundwater points potentially missed during the hydrocensus survey. It is important to note that the objective of a hydrocensus is not to identify all possible boreholes within the study area or model domain, but rather to provide a baseline of the current background groundwater conditions. It is the considered opinion of the projects Geohydrological Specialist that 62 geosites are adequate to perform statistical analysis to provide a conceptual understanding of on-site conditions.

2.4.12 Any investigation is based on certain assumptions and limitations, however in this case as there are already data available from the Cluster 1 development, the assumptions and limitations can be justified and should not be viewed as being fatally flawed, but rather be addressed as part of a continual data gathering process i.e., updated drilling information, geophysical information, water monitoring data, etc.

2.4.13 It can thus be concluded that, should the prescribed mitigation and management measures, as stipulated in the groundwater management plan, be implemented and honoured, the impacts associated with the project phases can be minimised. It is important that an integrated groundwater monitoring program be developed and applied to serve as an early warning and detection mechanism to implement mitigation measures. The calibrated groundwater flow model should be applied as groundwater management tool for future scenario predictions.

EVALUATION

2.5 I have considered the numerous contentions that the appellants have made in support of this ground of appeal, as encapsulated above, as well as the applicant's submissions in response thereto. I have also considered the record of information. I find as follows:

2.5.1 I note that the applicant appointed appropriately qualified specialists and conducted assessments of the air quality and climate change impacts. The air quality and climate change impact assessment report served before me and appended as Appendix 4 of the FEIAr.

2.5.2 As recorded in section 9.1.4 of the FEIAr and section 10 of the FEIAr, the climate change assessment considered scope 1,2 and 3 emission sources during various phases of the project, covering the full lifecycle of the project.

2.5.3 I have noted that fugitive emission, flaring and CO2 venting were also considered in the CCIA report, and the emission factors are recorded in Appendix A thereof. As recorded at section 4.1.2 of the FEIAr, the gas pressure in the Virginia gas field is extremely low owing to the non-confined reservoir with the gas flowing passively out of the wells at -0.4 barg. Moreover, as recorded at section 4.1.3.1 of the FEIAr, blowout or blowback of water and/or gas will be prevented using a blowout diverter which will be installed in the drill line on surface and the blowout diverter valves to safely direct any water and/or gas to a discharge line for safe disposal.

2.5.4 I have noted the applicant's response that the LDAR is a requirement of the Atmospheric Emission Licence (AEL), and therefore further details on the frequency of inspections, including specific details will be included in the AEL. Further, the mandatory requirements for vapour recovery will be defined in the AEL. The monitoring and reporting requirements for flaring will also be clarified in the AEL to ensure timely detection and response. I pause to point out that page 4 of the EA explicitly provides that *"This authorisation does not negate the holder of the authorisation of the responsibility to comply with any other statutory requirements that may be applicable to the undertaking of the proposed activity."*

2.5.5 I pause to note with concern that the second appellant, albeit a registered I&AP that was privy to all the specialist studies commissioned by the applicant for its (the applicant's) EA application would elect to appoint an expert to provide input when the PPP has ended, and the EA application was already adjudicated upon by the CA. I am cognisant that the public participation process (PPP) is a necessary step in the process to provide I&APs with the necessary information on the proposed activities and to afford them an opportunity to make informed and meaningful representations on matters concerning the proposed project. In this regard, I am guided by regulation 43(1) of the 2014 EIA Regulations, which provides that: *A registered*

interested and affected party is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.

2.5.6 I note that the second appellant has sourced a report from Dr. Steven Campbell, a geologist and hydrogeologist with over 30 years of experience on wide range of projects and issues globally, reviewed the FEIAr and supporting technical documents, and identifies substantial gaps and flaws in these documents. The report thereof is marked and appended as Annexure "A1". The appellant does not explain why if at all this information was not sourced at the appropriate time to ensure that the information could be addressed in the PPP and assessed during the EIA process. The PPP is also intended to give the applicant an opportunity to address the concerns of the I&APs and where necessary to mitigate against these concerns. The appellant now surreptitiously raises new information in the appeal process, which in my view unfairly prejudices the applicant and defeats the purpose and objective of the PPP. In my view, the appellant's conduct is inappropriate in that it seeks to circumvent the EIA process and to use the appeal process to thwart the applicant's proposed project.

2.5.7 Nevertheless, for the sake of completeness, I referred the new information provided on appeal to my Technical Advisory Team (TAT) appointed in terms of Regulation 6 of the 2014 Appeal Regulations for their consideration and recommendation on the technical issues arising therein. In relation to the CCA, I am advised by the TAT as follows:

2.5.7.1 The Expert Critique has identified legitimate omissions in the calculation of the GHG emissions for the project. It is suggested that the omissions identified by the Expert Critique could be material to the currently projected more than 8.5 million tons of Scope 1, 2 and 3 CO2eq emissions (excluding the Use of Sold Products) over the 20-year life of the project.

2.5.7.2 The physical risks of climate change are dealt with somewhat lightly, and there could have been a more detailed analysis of the impacts of climate change on the various activities associated with the construction and operation of the project, and on the environment and affected communities.

2.5.7.3 There is a growing opinion that natural gas can have a climate warming effect that is equal to or exceeds that of coal, particularly due to fugitive CH4 leakages during storage and transportation of LNG. These more recent studies have not been highlighted in the CCA.

2.5.7.4 The CCA should be expanded upon to include the following:

2.5.7.4.1 Specifically address the issues raised by the Expert Critique relating to the GHG emissions calculations;

2.5.7.4.2 Provide a more detailed analysis of the impacts of climate change on the various activities associated with the construction and operation of the project, and on the environment and affected communities; and

2.5.7.4.3 Expand further on more recent information relating to LNG as a viable "bridging fuel" for reducing GHG emissions.

2.5.8 I note that the potential contamination of the shallow intergranular aquifer caused by leakage of stray gas from production boreholes was assessed in section 10.2.2.6 of the FEIAr, and the identified mitigation and management measures included in the ground water management plan. I have also noted that an integrated ground water monitoring programme has been developed in section 15 of the Ground Water Impact Assessment Report ("GIA report"), and will be implemented to serve as an early warning and detection mechanism for any negative quality or quantity impacts to implement the mitigation measures.

2.5.9 The impact on portable aquifer was assessed in section 10.2.2.6 of the FEIAr and according to the EAP it is highly unlikely that well drilling will have a significant contribution to potential fracture or preferred pathway formation. Furthermore, the post-closure monitoring program and network was developed in section 14.5 of the GIA report in order to cater for ongoing risks.

2.5.10 Regarding, the second appellant's averment that the applicant failed to adequately consider the impact of the gas production activities on groundwater in the area, I considered whether the assessment of the impact of groundwater by the specialist geohydrology is flawed.

2.5.11 It is common cause that the applicant submitted the GIAR in support of the application for EA. Potential impacts of the proposed activities are identified in section 13 of the GIAR. Having

regard to the identified impacts the specialist identified the ground water management plan and suitable mitigation measures in section 14 of the GIAR.

2.5.12 I have noted section 1.6 of the GIAR that according to the specialist data limitations were addressed by following a conservative approach and assumptions.

2.5.13 In addition, I note that page 52 of the EA under paragraphs 5.5.8 and 5.5.9, respectively provides that:

"Mitigation management measures presented in the geohydrological specialist assessment must be incorporated into the existing groundwater management plan and implemented during operations."

"All groundwater flow pathways which are in direct connection with surface topography such as decommissioned Cluster 2 gas production boreholes as well as historical mining exploration boreholes which Tetra4 converts into production wells, should be sealed off and rehabilitated according to best practice guidelines."

2.5.14 I also took cognisance of the Annexure A3 to the second appellant's appeal being the *"Expert Report Concerning Geologic and Hydrogeologic Aspects of Tetra4's Custer 2 Virginia Gas Production Project, Virginia, Free State Province, South Africa"* dated 20 July 2023 and the Executive Summary thereof provides as follows:

"I was retained to provide Centre for Environmental Rights (CER) with independent analysis and expert opinions regarding select geologic and hydrogeologic aspects of the Environmental Impact Assessment (EIA) and associated technical reports supporting Tetra4 (Pty) Ltd's proposed Cluster 2 expansion of their existing natural gas field (Cluster 1) near Virginia, Free State Province."

2.5.15 In relation to the geological and hydrological aspects, I am advised by the TAT as follows:

2.5.15.1 The hydrology report is well-written and scientifically sound (i.e. in line with industry standards). However, it is noted that climate change and the impacts of climate change on the proposed project were not considered.

2.5.15.2 The climate and peak flows associated with the rivers modelled are based on historical data analyses which is standard practice. Therefore, not considering

climate change is not viewed as a fatal flaw. It is however recommended that some consideration to climate change and the impacts on river hydrology be considered before the application is processed, specifically in areas prone to flooding, and flood damage and where site infrastructure will be developed. Potential negative impacts due to climate change (i.e. storm intensities, runoff volumes etc.) were not adequately addressed in the existing report.

2.5.16 The Geohydrology Report has several gaps, specifically:

2.5.16.1 The study leans towards a desktop-level only study, with minimum site work conducted and data validation (ground truthing) at the actual project area. This is generally achieved by undertaking drilling test work and aquifer testing to inform the site conceptual model.

2.5.16.2 Collection of baseline groundwater information was attempted but there is no evaluation of the rather limited data collected (i.e. ambient groundwater quality of nonproject wells? volumes utilized? where water levels measured during pumping as there is a big variation in static water levels?).

2.5.16.3 The site conceptual model is too large and does not represent the site-specific conditions, and this was carried over to the numerical model which was oversimplified due to the lack of in-situ data.

2.5.16.4 The potential hydrogeological impact (source terms) of Tetra4 activities is not clearly defined (i.e. will the PCDs be lined, what will the water quality be, and where does the water come from). How source terms were applied in the numerical model is also not well understood.

2.5.16.5 Details of the construction of the gas wells regarding possible leakage of deep groundwater into the shallow aquifer are not addressed.

2.5.16.6 Details of the stratigraphy and hydrogeology of the gas wells are required, as well as the deep confined aquifer and the associated water quality. The presence of gas indicates that the deeper aquifers are confined and there are no details of piezometric pressures and water quality. This data must be available from the gas resource evaluation.

2.5.16.7 The groundwater modelling does not have a clear objective and arbitrary scenario modelling is rather vague.

2.5.17 It is advised that further work be conducted, specifically to address the points mentioned above, before the EIA is approved. As it is the risks were only addressed on a preliminary level.

2.5.18 In light of the above, I deem it appropriate to remit this aspect of the decision taken by the DMRE back to it for reconsideration. I deal with this more fully under the heading "DECISION".

Second Ground of Appeal: The Environmental Strategic Impact Assessment (ESIA) fails to consider that the prospective site is in a hotspot of climate change-induced water scarcity intensification and the project does not adequately take into account the climate change aspects

2.6 The first appellant submits that:

2.6.1 South Africa is a water-stressed country with an average annual rainfall of 500 mm. All climate change scenarios could have adverse impacts on the water resources of the country. Recent climate model projections show that temperature and precipitation over three sub-national regions - western, central, and eastern South Africa, encompassing the area of the Virginia gas fields - are likely to change under a wide range of global climate mitigation emission and policy scenarios.

2.6.2 Sub-Saharan Africa is bearing the brunt of the climate emergency in terms of increased heat waves and drought. The Intergovernmental Panel on Climate Change (IPCC) in its sixth Assessment Report (AR6) identified southern Africa as a climate change 'hotspot', the designation for a location where climate change impacts are abnormally high within a global context. This finding stems from the region's subtropical climate, already warm and dry, which under all climate change emissions regimes is projected to become drastically warmer and likely also drier. This combination of changes implies that options for adaptation are limited. Over the last several decades, warming in the southern African interior has occurred at about twice the average rate of global warming.

2.6.3 The two most important agricultural products of the Virginia area are critically threatened by a climate warming of 3°C. The IPCC SR1.5 specifically identified the two major agricultural risks for southern Africa under drastically warmer and drier future, allowing that there may be

additional risk. First, the maize crop, the staple most produced around and within the applicant's project area, is likely to be substantially reduced - even to the point of collapse - under 3°C of global warming. This is a consequence of the vulnerability of maize crop yield to the combined effects of high temperatures and drought. Second, the livestock industry, also important in the project area, is similarly at risk becoming unviable under 3°C of global warming, due to the negative effects of heat stress on wool, milk and meat production.

2.6.4 In 2019, 6.5 million South Africans (11% of the overall population) were classified as food insecure. The figure was 28% in 2015 for Free State Province with a population of 3 million people. The risk of food insecurity, and in particular national food sovereignty, increases in Southern Africa for a 1.5°C global mean temperature rise, and increasingly so for warming above that level. The Free State Province is considered the 'breadbasket of South Africa'. The province alone produces over 35% of the maize in South Africa. Overall, the environmental conditions and natural resources of the Free State are conducive for maize production, but there are concerns of looming agro-climatological hazards which may have a detrimental effect on production.

2.7 The second appellant submits as follows that:

2.7.1 The FEIAr and DMRE failed to adequately consider the climate change impacts of the Project, and therefore failed to meet the requirements of, inter alia, section 24O(1) NEMA to account for all relevant factors, in particular those regarding the pollution, environmental impacts or environmental degradation "likely to be caused if the application is approved" as well as any guidelines, departmental policies, and environmental management instruments and any other information in the possession of the competent authority relevant to the Application. This is also in contravention of the NEMA requirement to ensure that the activity's potential environmental impacts are properly assessed.

2.7.2 Based on the FEIAr, DMRE concluded that "The identification and assessment of potential impacts of the activity, including cumulative impacts, was adequately undertaken, and the proposed mitigation and management measures are aligned with potential impacts."

2.7.3 This finding, however, is based on a substantially flawed climate change impact assessment (CCIA) that contains several critical data gaps and missing greenhouse gas (GHG) emissions estimates, thus serving to underestimate the potential effects of the project on South Africa's GHG inventory and contribution to climate warming.

2.7.4 Dr. Eloise Marais is an atmospheric chemist and air pollution researcher who is currently an Associate Professor at University College London. Dr. Marais has published widely in the field of greenhouse gas (GHG) and air pollutant emissions and runs advanced models to assess emissions' influence on climate, air quality, ecosystems and public health. She has wide experience reviewing project emissions estimates and reviewed and critiqued the project CCIA, identifying substantial gaps and flaws. Her report is attached, marked Annexure "A2". We provide a short summary of the report's findings here.

2.7.5 Dr. Marais' critique (Marais Report) reviews and critiques the adequacy and accuracy of the GHG emissions calculations in the CCIA and interpretation in the EIA, taking into consideration the CCIA requirements in South Africa for projects with potential climate impacts. In particular, the critique assesses whether the CCIA estimates and considers the impacts of the full life cycle GHG emissions that would result from the project, in alignment with the 2017 judgment in the case of Earthlife Africa Johannesburg v the Minister & Others (the Thabametsi judgment), which confirmed that a CCIA with a life-cycle GHG emissions assessment is a necessary component of an EIA for projects with climate impacts.

2.7.6 In the Thabametsi judgement, the court acknowledged the need for a CCIA much broader than a simple assessment of anticipated GHG emissions. It confirmed the need for a comprehensive assessment, which assesses, inter alia, the project's full life-cycle emissions, the carbon footprint of the project calculated for construction and decommissioning, the activities associated with the project, the physical risks from climate change to the project, and the ways in which the project might aggravate the impacts of climate change in the area.

2.7.7 As is shown in the Marais report, the CCIA fails to fully assess the project full life- cycle emissions. The CCIA estimates Scope 1, 2 and 3 emissions, where Scope 1 are the emissions directly attributable to the project and Scope 2 emissions are the emissions associated with bought-in electricity. Scope 3 emissions consider the "embedded" carbon in bought-in materials

such as steel and cement and the transport and end use of exported products such as combustion of natural gas for electricity generation. While Scope 1 and 2 emissions are factored into the FEIAR's project impact assessment and determination of final significance, Scope 3 emissions are omitted, in misalignment with the Thabametsi judgement.

2.7.8 The Marais report identifies numerous missing GHG emissions estimates from both Scope 1 and Scope 3 emissions categories and makes key recommendations that would improve the CCIA's estimates. Dr. Marais stresses that "Such improvements are strongly recommended for a more realistic assessment of the project's potential GHG emissions and climate impact and to generate a CCIA that is sufficiently detailed for effective decision making.

2.7.9 The Marais report finds missing and questionable Scope 1 emissions estimates in the CCIA that "contribute to a significant underestimate in emissions of the potent GHG methane (CH4) and so underestimate the potential global warming of the project." These faulty estimates include: 1) a reliance on outdated global warming potential (GWP) values that are about 20% less than contemporary expert consensus knowledge; 2) an assumption of an unrealistic high natural gas processing flaring efficiency; 3) the omission of operational gas production fugitives and flaring CH4 emissions; and 4) failure to estimate well drilling and testing CH4 emissions during the project's construction phase.

2.7.10 The Marais report also finds that the Scope 3 emissions estimates in the CCIA are "both incomplete and questionable". The primary concern is a complete lack of detail in the FEIAr or CCIA on the end use of the project's liquified natural gas (LNG), which render it impossible to accurately estimate the emissions associated with transport-related direct and fugitive emissions. Dr Marais notes, "[t]he CCIA provides no details on the end use of the produced LNG other than assuming that 60% of the LNG is shipped to China, and 100% of the LNG end use is 'combustion'. As such, end use of a large proportion (40%) of LNG is unaccounted for".

2.7.11 A second major issue with the CCIA's Scope 3 emissions estimates is the unfounded claim, repeated in the CCIA and FEIAr, that LNG from the project will replace other more polluting fossil fuels and thus result in a decrease in GHG emissions. The CCIA makes the comparison for 100% of the project's projected LNG (155750 tons per year) replacing diesel, heavy fuel oil (HFO), and liquified petroleum gas (LPG). As the Marais report states, "Since the domestic or

international markets for combustion of the applicant's LNG remain undefined and uncontextualized in the EIAr and the CCIA, this comparison and suggestion of LNG replacement is unsupported by the CCIA".

2.7.12 The Marais report contextualises the above missing GHG emission terms from the CCIA within the myth of gas as a reliable "bridge fuel" that contributes less to global climate warming than coal but is available more rapidly than renewables like wind and solar. In fact, as the Marais report states, "Natural gas is mostly (>90%) CH4, a much more potent GHG than CO_2.

2.7.13 According to the latest IPCC report, CH_4 has a global warming potential (GWP) that is 72 times higher than CO_2 on a 20-year timescale and 28 times higher on a 100-year timescale, meaning that on a 20-year time horizon, a ton of emitted CH_4 warms the planet 72-times more than a ton of emitted CO_2. CH_4 during up- and midstream processes can be released as leaked or fugitive emissions. This means that natural gas can have a climate warming effect that is equal to or exceeds that of coal".

2.7.14 As the project proposes to extract, processes, and distribute gas that is primarily CH4, which is a particularly potent GHG, a comprehensive life cycle CCIA is needed to assess the true climate change impacts of the project. As the Marais report finds "...the CCIA deviates from best-practices and state-of-science in emissions and climate impacts estimates".

2.7.15 South Africa is a signatory of the Paris Agreement and of the United Nations Framework Convention on Climate Change (UNFCCC). This commits South Africa to "pursue efforts to limit the temperature rise to 1.5°C." Despite our particular vulnerabilities to climate change, South Africa is already lagging behind in the global effort to address climate change. South Africa's Nationally Determined Contribution (NDC) target under the Paris Agreement is to have annual GHG emissions in a range from 350-420 Mt CO2 by 2030, which our policies and governmental actions are not on track to meet.

2.7.16 The Climate Equity Reference Project (CERP) also assesses South Africa's "fair share" contribution and found that South Africa's NDC target was insufficient to meet the global 1.5°C target. CERP assessed South Africa's fair share of GHG emissions using the Climate Equity Reference Framework, a fair share analysis framework supported by a wide range of civil

society groups, including several in South Africa. The South African government itself also relied on the fair share framework to justify the ambition and fairness of its draft NDC update. This framework presents an ethically coherent method for calculating national fair shares for all countries, whatever their development status. Specifically, CERP found that South Africa fair share range of emissions reductions consistent with limiting warming to 1.5°C is 274-352 MtCO2eq by 2030. Based on this finding, CERP concludes: "South Africa has no excess emissions allocation that would allow its emissions to rise above the level that it would emit without any mitigation efforts (the "baseline"), and indeed must reduce [its 2030] emissions by ... between 146 and 223 $MtCO_2eq$ below that level as its fair share of limiting warming to 1.5°C".

2.7.17 The approval of a gas project is not in alignment with progress towards meeting South Africa's NDC or fair share emissions reductions. As the Marais report concludes "[a]llowing new fossil fuel extraction facilities that promote the domestic and international use of gas plants has the potential to commit South Africa to decades of additional fossil fuel dependence and ultimately worsens the country's Paris Climate Accord commitments".

2.7.18 In summary, DMRE's approval of the EA considering the major gaps and flaws of its CCIA is a fatal flaw, violating the requirements of NEMA. In addition, the EA approval is inconsistent with the requirements section 6(2) of PAJA, because the decision-maker failed to consider "relevant considerations"; the action contravenes NEMA; and because the decision is unreasonable. For this reason, the EA should be set aside.

Applicant's Response

2.8 In response to the first appellant's ground of appeal, the applicant states that:

2.8.1 A comprehensive Climate Change Assessment (CCA) was included in Appendix 4 of the FEIAr and discussed within the FEIAr in various sections. The climate change baseline and physical risks associated with climate change in the region are discussed in Section 3 of the CCA. Two trajectories are included in the CCA based on the four Representative Concentration Pathways (RCPs) discussed in the IPCC's fifth assessment report (AR5) (IPCC, 2013). RCPs are defined by their influence on atmospheric radiative forcing in the year 2100. RCP4.5 represents an addition to the radiation budget of 4.5 W/m^2 as a result of an increase in GHGs. The two RCPs selected were RCP4.5 representing the medium-to-low pathway and RCP8.5 representing the

high pathway. The impact of climate change is assessed and discussed in the FEIAr (refer to Sections 10.2.1.2 and 10.2.2.2).

2.9 In respect of the second appellant's ground of appeal, the applicant submits that:

2.9.1 A CCIA was included in Appendix 4 of the FEIAr and this assessment considers the various project phases as well as the Scope 1, 2 and 3 emissions. In the absence of specific justification by the Appellant in making this comment, no further response is possible.

2.9.2 The impact assessment was presented in Section 10 of the FEIAr which included cumulative impacts. In the absence of specific justification by the appellant in making this comment, no further response is possible.

2.9.3 The second appellant alleges critical gaps in the CCA and missing GHG emissions without providing specific detail to this allegation. In the absence of specific justification by the second appellant in making this comment, no further response is possible.

2.9.4 Scope 1, 2 and 3 GHG emissions were accounted for in the CCIA. Scope 3 GHG emissions are reported under Section 4.3 of the CCIA report as well as in Section 9.14.6 of the FEIAR and Section 10.2.2.2.1 of the FEIAr where it is stated *"The contribution of Scope 3 to GHG emissions would still result in a Medium significance".*

2.9.5 The methodological guidelines for quantification of GHG emissions (DFFE, 2022), published in October 2022, have been used to estimate the Scope 1 GHG emission where the 100-year GWPs must be used.

2.9.6 The flaring efficiency was provided, yet a continuous flare was assumed which is a conservative estimate.

2.9.7 The operational gas production fugitives are an omission and have been calculated and will increase the operational phase Scope 1 GHG emissions by 3.2 times. However, the overall contribution to the total SA GHG emissions (2020) remains less than 0.1%.

2.9.8 The methane component of the well drilling, well testing, and well servicing is not known since total CO_2eq emissions were based on measurements provided by the client, and not calculated using emission factors. These activities were included under construction operations.

2.9.9 Combustion of LNG was accounted for under Scope 3 (100% of the LNG) as a worst-case scenario. It was assumed that 60% would be exported to China, but all of the LNG would be combusted either in China (60%) or locally (40%).

2.9.10 The second appellant's argument is not supported by a proposed alternative comparison to LNG use and therefore it is the opinion of the CCA specialist that LNG displacement of HFO, LPG and diesel in the CCA is a logical conclusion as this is currently occurring globally during the transition by many countries.

2.9.11 The SA methodological guidelines for quantification of GHG emissions (DFFE, 2022), published in October 2022, stipulate that the 100-year GWPs must be used. This is to ensure consistency between projects. Studies show gas has a lower life cycle GHG impact than coal (PACE, 2015).

2.9.12 The SA methodological guidelines for quantification of GHG emissions (DFFE, 2022), published in October 2022 were used and this is regarded best-practice.

2.9.13 The high-level strategic direction of South Africa's gas industry in relation to the Paris Climate Accord commitments is determined by the relevant authorities and institutions and it is therefore assumed that existing policy and legislation has been drafted with due consideration to such.

2.9.14 The CCIA included in the FEIAr and the assessment undertaken in the FEIAr, the second appellant's contention that the CCIA contained major gaps or flaws is considered materially incorrect.

EVAUATION

2.10 In evaluating the first appellant's ground of appeal, the crisp issue for determination is whether the proposed development would give rise to unacceptable risks to local groundwater and

surface water quality. I have considered the first appellants detailed submissions made in support of this ground of appeal, as encapsulated above, as well as the applicant's submissions in response thereto. I have also considered the record of information. I find as follows:

2.10.1 I have noted that a CCIA was conducted as part of this application for EA to determine the potential long term climate change impacts as a result of the Tetra4 Cluster 2 operations. Greenhouse gas (GHG) emissions for the project were calculated based on the Department's 2022 Methodological Guidelines for Quantification of GHG Emissions, which are based on the Intergovernmental Panel on Climate Change (IPCC) emission factors.

2.10.2 As recorded in paragraph 6 of the CCIA report, it is clearly stated that construction and operational related GHG emissions from the proposed Tetra4 Cluster 2 project cannot be attributed directly to any particular climate change effects, and, when considered in isolation, will have a Low to Medium impact on the National GHG inventory total. The main GHG impact is associated with downstream use of the LNG, i.e. Scope 3. GHG emissions per unit of gas combusted, however, is less than per unit coal.

2.10.3 I note that the specialist climate change assessment states that climate change is a global challenge and there is a collective responsibility to address the global challenge of climate change and Tetra4 has an individual responsibility to minimise its own negative contribution to the issue. Based on Tetra4 Cluster 2 Scope 1, 2 and 3 GHG emissions, it is the specialist opinion that the project may be authorised due to its low to medium impact significance.

2.10.4 The operation impact significance rating for vehicle and trucks, natural gas generators, the processing and flaring of gas, fugitive releases, and indirect upstream and downstream emissions could result in Medium significance on climate change and could reduce, although still Medium significance with mitigation and adaptation measures in place (Table 12).

2.10.5 On the issue of groundwater, the geohydrology assessment specialist concludes that, during the operational phase the environmental significance rating of groundwater quality impacts on down-gradient receptors are rated as medium to high negative without implementation of remedial measures and low to medium negative with implementation of proposed mitigation measures.

2.11 I now turn to evaluate the second appellant's ground of appeal. The issue for determination in relation to the second appellant's submissions is whether the applicant adequately assessed the impact of the proposed activities on climate change. Having considered the second appellant's detailed submissions, as well as the applicant's submissions in response thereto and the record of information, I find as follows:

2.11.1 Insofar as the second appellant relies on the case of *Earthlife Africa Johannesburg v the Minister & Others*, the facts of this case are not analogous to the facts in the matter at hand. In the matter at hand, the climate change impacts were assessed in the Climate Change Impact Assessment Report (CCIAr) that was submitted by the applicant in support of its application for EA. The applicant submitted a CCIAr (Appendix 4 of the FEIAr) to the CA which was compiled by a specialist in support of the application. The CCIA report assessed the climate change baseline and the impact of GHG emissions (Scope 1, Scope 2, and Scope 3 emissions) associated with the project on the National GHG Inventory and the Energy Sector.

2.11.2 I note that the full lifecycle emissions, the carbon footprint of the project calculated for construction and decommissioning, are assessed in paragraph 9.14 of the FEIAr and the EAP identified suitable measures to manage, avoid or mitigate identified impacts. The full lifecycle emissions, the carbon footprint of the project calculated for construction and decommissioning is assessed in section 4 of the CCIA report and the specialist identified suitable measures to manage the identified impacts.

2.11.3 The reports submitted by the second appellant in support of its grounds of appeal were not before the decision maker at the time of the decision-making process. In the circumstances, it cannot be said that they CA acted unreasonably by not considering a report that was not placed before them.

2.11.4 I note that the second appellant has sourced a report from Dr Eloise Marais, relating to atmospheric science. I have taken note of Dr Marais' credentials and that she leads the University College of London (UCL) Atmospheric Composition and Air Quality research group involved in using complex models and observations from space-based and ground-based platforms to determine the influence of humans on air quality, atmospheric chemistry, ecosystems and human health. She also serves on local and international expert panels.

2.11.5 The report thereof is marked and appended as Annexure "A2". As with Annexure 1, the appellant does not explain why if at all this information was not sourced at the appropriate time to ensure that the information could be addressed in the PPP and assessed during the EIA process. The PPP is also intended to give the applicant an opportunity to address the concerns of the I&APs and where necessary to mitigate against these concerns. The appellant now again surreptitiously raises new information in the appeal process, when it could have raised this issue during the PPP.

2.11.6 As indicated above, the appellant's conduct is inappropriate. The appeal process should not be used to raise issues that should have been raised during the EIA process, especially during the public participation process for the proposed project. Nevertheless, in relation to the CCA, I am advised by the TAT as follows:

2.11.6.1 The Expert Critique has identified legitimate omissions in the calculation of the GHG emissions for the project. It is suggested that the omissions identified by the Expert Critique could be material to the currently projected more than 8.5 million tons of Scope 1, 2 and 3 CO2eq emissions (excluding the Use of Sold Products) over the 20-year life of the project.

2.11.6.2 They are of the opinion that the physical risks of climate change are dealt with somewhat lightly, and that there could have been a more detailed analysis of the impacts of climate change on the various activities associated with the construction and operation of the project, and on the environment and affected communities.

2.11.6.3 There is a growing opinion that natural gas can have a climate warming effect that is equal to or exceeds that of coal, particularly due to fugitive CH4 leakages during storage and transportation of LNG. These more recent studies have not been highlighted in the CCA.

2.11.7 In light of the above, I am of the view that the CCA should be expanded upon in order to include the following:

2.11.7.1 Specifically address the issues raised by the Expert Critique relating to the GHG emissions calculations;

2.11.7.2 Provide a more detailed analysis of the impacts of climate change on the various activities associated with the construction and operation of the project, and on the environment and affected communities; and

2.11.7.3 Expand further on more recent information relating to LNG as a viable "bridging fuel" for reducing GHG emissions.

2.11.8 In light of the above, I deem it appropriate to remit this aspect of the decision taken by the DMRE back to it for reconsideration. I deal with this more fully under the heading "DECISION"..

Third Ground of Appeal: Insufficient Public Participation Process (PPP)

2.12 The first appellant contends that:

2.12.1 The applicant and its appointed EAP have failed to engage in meaningful consultation in violation of the principles of fair administrative decision-making and the right of interested and affected communities to be meaningfully consulted prior to a decision on authorisation being made, and in violation of section 2(4)(f) of NEMA, which stipulates that the participation of all I&APs in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured.

2.12.2 It is also inconsistent with section 2(4)(g) of NEMA, which requires that decisions must take into account the interests, needs and values of all I&APs, and this includes recognising all forms of knowledge, including traditional and ordinary knowledge.

2.12.3 Public participation is required by the 2014 EIA Regulations and forms an integral part of all phases of the EIA process. The purpose is to provide a source of information for the EIA from I&APs. This process must provide an opportunity for the public to present their views, concerns and values, and to influence project design in a positive manner. In addition, to ensure trust and openness, public participation must make sure that it considers local and traditional knowledge from I&APs.

2.12.4 There is a concern over the PPPrelating to both adequate notification as well as meaningful engagement with all I&APs. It remains unclear whether adequate efforts were made to notify and engage with various stakeholders, including farm owners, lawful occupiers, land claimants, and rural land users.

2.12.5 On the applicant's own admission, *"Not every individual in the community could be interviewed therefore only key people in the community were approached for discussion. These key people include all the directly affected landowners. Additional information was obtained using existing data."*

2.12.6 This highlights the defects in the PPP. Furthermore, the directly affected landowners are mainly farmers who play a significant role in the local economy of the Free State as well as ensuring food security. In addition to this, given South Africa's employment challenges, there remains a possibility for a knock-on as these farmers provide employment for their labourers as well as housing. The EA could impact a significant number of constitutional rights for a wide variety of people.

2.12.7 The Free State Griqua Council (FSGC) is an NGO that has operated for the last 40 years to advance the rights and culture of indigenous people in the Free State particularly the Griqua community. In particular, the indigenous community in the Xhariep district, who are represented by the FSGC, were not aware of the EA application and therefore did not participate in the process prior to the EA being granted. It is particularly notable that the project proponent is a member of the United Nations Global Compact under which they have voluntarily agreed to uphold various international legal best practices such as the Rio Declaration which centre the involvement of indigenous people.

2.12.8 Principle 22 of the Rio Declaration states "Indigenous people and their communities, and other local communities have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture, and interests and enable their effective participation in the achievement of sustainable development." Therefore, in failing to include the FSCG and their constituents the applicant has also fallen short of their internal commitments to these best international practices.

2.12.9 The community was not consulted and therefore there is no information that was evaluated within the FEIAr as it relates to the risk that the impacts of this activity will have on their cultural rights and heritage. Furthermore, the community has been inadvertently excluded from the PPP which has resulted in their concerns and perspectives having not been meaningfully considered. The absence of this is viable in Appendix B of the comments and response form. This omission suggests that the EAP prioritised the interests and impacts on commercial farm owners at the expense of the rights of other important stakeholders such as the the FSGC. The failure to respect and uphold these rights erodes the affected communities' trust and confidence in the project.

2.12.10 The measures taken by the EAP during the PPP have raised concerns about the lack of notification and meaningful engagement with all I&APs, including farm owners, lawful occupiers, land claimants, and rural land users. The absence of their inputs and concerns in the provided comments and response sheets, along with the omission of their involvement in the consultation process, indicates their exclusion from decision-making processes. It is therefore unlikely meaningful and effective public participation was implemented in a manner where their rights to public participation where upheld and consistent with sections 2(4)(f) and 2(4)(g) of NEMA.

2.12.11 The failure of the DMRE to take into account the United Nations Guiding Principles on Business and Human Rights and its applicability to corporate conduct also grants the decision to award the environmental authorisation invalid. The UNGPs are an internationally recognized set of principles regulating the conduct of corporations, which require corporations to protect human rights, respect and remedy harm where they have been the cause of such.

2.12.12 Exploratory well drilling for gas and helium deposits is by its very nature destructive and can have significant impacts on land, livelihoods and while the guidelines are voluntary, courts have begun to infuse these soft-law principles into binding judgments such as in the case of *Milieudefensie v Royal Dutch Shell* in the Netherlands. As the climate crisis is a human rights crisis, the need and desirability for this project and its impacts on various human rights such as the right to a healthy environment, the right to life and the right to equality must be respected. This is in line the NEMA Section 2 Principles, including the precautionary principle and the

principle that requires development to be environmentally, socially and economically sustainable; and the constitutional right to an environment that is not harmful to health or wellbeing – as enshrined in section 24 of the Constitution.

2.12.13 South Africa is a co-sponsor of the binding treaty on Business and Human Rights at the international level which places an obligation on the State to align its domestic decision-making with its international position on the conduct of corporations. The duty to protect human rights, which is the first pillar of the UNGPs is an obligation on the State. There is a lack of human rights due diligence carried out by the applicant. The UNGPs state that: *"a requirement for human rights due diligence is most likely to be appropriate where the nature of business operations or operating contexts pose significant risk to human rights."* This is inherent, given the nature of the EA application, and the failure to do so results in South Africa failing to uphold its international law obligations.

2.12.14 The above suggests that the FEIAr and the DMRE failed to adequately consider any guidelines, departmental policies, and environmental management instruments and any other information in the possession of the CA relevant to the EA application in which case these United Nations Guiding Principles on Business and Human Rights are relevant.

2.12.15 This failure on the part of the DMRE's decision to authorize is also in contravention of the NEMA requirement to ensure that the activity's potential environmental impacts are properly assessed in light of all relevant considerations.

2.13 The second appellant submits that:

2.13.1 When dealing with the social impact of the proposed Cluster 2 expansion, the FEIAr reflects that *"[t]he proposed site for the Cluster 2 project is located in Wards 9 and 24 of the Matjhabeng Local Municipality and Ward 6 of the Masilonyana Local Municipality that forms part of the Lejweleputswa District Municipality in the Free State Province."*

2.13.2 The FEIAr describes the complexity of poverty and the various poverty levels in the affected area, the education levels, ("Ward 9 has the highest proportion of people who have completed Grade 12 or higher, while more than 70 % of people in Wards 6 and 24 have not completed

secondary school,") and compromised access to basic infrastructure, for example, "The highest incidence of households that do not have access to any sanitation services is in Ward 24, with approximately a third of the households in the ward having access to pit toilets without ventilation." inter alia.

2.13.3 The EA lists the "parent farms" affected by the Cluster 2 expansion. There are 66 farms on the list. Despite having all but completed its Cluster 1 project, there is no information in the EIA documentation about how many households are situated on the impacted (or "parent") farms or how many people work and/or live on the impacted farms. The FEIAr describes its approach to public participation as follows:

"At the start of the application process, an initial I&AP database was compiled based on known key I&AP's (previous Cluster 1 application, affected landowners, Organs of State, etc.), Windeed searches and other stakeholder databases. The I&AP database includes amongst others, landowners, communities, regulatory authorities, and other special interest groups. The database has been continually updated as and when new I&AP's show interest in the application."

2.13.4 It is patent that the applicant has made little to no attempt to ensure that those who will be impacted most by its Cluster 2 expansion understand its implications and have participated in the application process. It lists the government departments, NGOs and NPOs that are on its I&AP database, but makes only cursory reference to local people – arguably the ones who will be most impacted – as follows:

"In addition to the above, attempts to consult with directly affected landowners, adjacent landowners, community and farming representatives, occupiers of land, etc. were made. A total of 78 site notices and a number of A3 posters were placed in and around the study area in conspicuous area in an attempt to solicit input from any I&AP's who were not pre-identified and registered on the I&AP database."

2.13.5 For the scoping phase, the posters referred to were put in place for 4 days from 16 to 19 May 2022. Notices by registered letters, faxes, and emails were only distributed to pre-identified I&APs. This did not include those living and/or working on farms. A once-off advert was placed

in newspapers and the Government Gazette. Only 50 people attended the Stilte community meeting, only 6 people attended the meeting dedicated to landowners, only 14 people attended the Adamsons Vley community meeting and only 10 people attended the open day. These numbers contrast significantly with the number of people living in the affected municipalities according to the Final EIAr.

2.13.6 It appears from the minutes that no documentation was handed out at the meetings. Instead, participants were shown posters and a presentation and were asked to comment on the proposed project there and then in the meeting. What should have been initial information meetings, given the extent and complexity of the impacts of the proposed project, were all Tetra4 did by way of "consultation".

2.13.7 For the EIA phase, although a similar approach to public participation is described in the FEIAr there is no mention of this phase in the Public Participation Report attached to the FEIAr, nor is there any evidence of consultation at the EIA phase in its annexures.

2.13.8 The applicant has fallen foul of its obligations regarding consultation under NEMA and its regulations and guidelines. This is particularly untenable when regard is had to the impacts that will be suffered by people living and/or working on farms if the expansion goes ahead. The applicant's Social Impact Assessment, attached to its FEIAr found that:

"The proposed Cluster 2 project will impact on high quality agricultural soil which is used to grow crops that contribute to food security in South Africa. One of the most significant potential social impacts associated with the proposed project is the potential impacts on livelihoods of the farming community. There are high levels of uncertainty about exactly how the Cluster 2 project will unfold. Farmers fear that their land rights and property values will be affected. The project will require access to farms, and because of the current socio-political issues in South Africa, this is a sensitive matter.....The potential impact on the livelihoods of some of the directly affected farmers may be severe. This will have a spinoff impact on farm workers, food security and the local economy. Every possible measure must be implemented to ensure that the production of the farmers is not permanently impacted. The project can only be recommended if the livelihood impacts are mitigated and managed successfully."

2.13.9 The most vulnerable of the affected communities' homes and livelihoods stand to be impacted most directly. The applicant is already operating in the area and is well-placed to do so, made no attempt to ensure that those members of the communities were properly informed or meaningfully consulted. The Social Impact Assessment attached to the FEIAr, refers to impacts on farm workers, makes much only how landowners should be compensated. Compensation for those working and/or living on farms, who stand to lose their homes and livelihoods, is not mentioned at all. Ignoring the most vulnerable, such as those living and/or working on farms, is precisely how poverty is deepened, and inequality is aggravated.

2.13.10 The DFFE Public Participation Guidelines issued in terms of the 2014 EIA Regulations state that:

"In the circumstances where an "area already suffers from socio-economic problems (high unemployment rate) or environmental problems (unrehabilitated abandoned gold mine, polluted groundwater) and is the project likely to exacerbate these. Then an "extensive consultation with [those who stand to be impacted] in the area should be undertaken, to gather more information on both the socioeconomic and environmental problems."

2.13.11 The importance of consultation and access to information in relation to mining was recognised by the Constitutional Court in the Bengwenyama case, where the Court held at paragraph 63 that, *"the granting and execution of a prospecting right represents a grave and considerable invasion of the use and enjoyment of the land on which the prospecting is to happen".*

2.13.12 At page 66 the Court held that *"Another more general purpose of the consultation is to provide landowners or occupiers with the necessary information on everything that is to be done so that they can make an informed decision in relation to the representations to be made, whether to use the internal procedures if the application goes against them and whether to take the administrative action concerned on review. The consultation process and its result is an integral part of the fairness process because the decision cannot be fair if the administrator did not have full regard to precisely what happened during the consultation process in order to determine whether the consultation was sufficient to render the grant of the application procedurally fair."*

2.13.13 The impacts of gas production are, on the applicant's own experts' reports, at least as grave and considerable as those of prospecting. Bengwenyama applies. In relation to the scoping

phase, the consultation process was wholly inadequate in that the persons working and/or living on the affected farms were not identified by the applicant, despite this information being within its reach as it is operating in the area, and it made no arrangements to consult with them specifically, as had been advised by its experts. This failure was plainly apparent from the information before the DMRE when it made its decision to grant the EA. In relation to the EIA phase there was no evidence of consultation before the DMRE.

2.13.14 The EA accordingly falls foul of section 33 of the Constitution, and section 2(2) of NEMA, of section 6(2) of PAJA and must be set aside on this basis alone.

Applicant's Response

2.14 The applicant's response to first appellant's ground of appeal is that:

2.14.1 Their first statement presents a summary of the purpose of public participation and although no response to this item is specifically required, it is worth noting that the first appellant did not become involved in the project's PPP until the appeal submission. No comments were submitted by the first appellant during the Call to Register, Scoping Phase or EIA Phase.

2.14.2 The first appellant claims that it is "unclear if adequate efforts were made to notify and engage with various stakeholders", however if the first appellant had reviewed the Public Participation Report (Appendix 3 of the EIAr) or Section 8 of the EIAr, it would have been clear that the efforts made to engage with stakeholders went beyond what the 2014 EIA Regulations require of public participation. This included a Call to Register which preceded the Scoping Report availability and involved the placement of not 1 site notice as required by NEMA but 78 site notices in and around the application area (locations provided in the report). Newspaper advertisements were placed in the Vista Newspaper (3 languages) and a notice placed in the Free State Provincial Gazette (3 languages). All notifications for each phase of the project were distributed in English, Afrikaans and Sesotho (the predominant languages in the application area and surrounds). Faxes, e-mails, SMSs and registered letters were sent to all registered I&APs during each notification event. During both the Scoping Phase and EIA Phase public participation process, a public open day (Scoping Phase) and public meeting (EIA Phase) were held along with separate focus group meetings with the communities (occupiers of the farms in and around the application area) and separate focus group meetings were held with the

landowners. It is therefore our contention that this argument that it is *"unclear if adequate efforts were made to notify and engage with various stakeholders"* has no merits.

2.14.3 The reference provided that *"not every individual in the community could be interviewed..."* is taken out of context as this reference is directly quoted from the Social Impact Assessment Report (SIA Section 3.2 Assumptions and Limitations and included in the EIAr Section 14.9 as the SIA Assumptions and Limitations). The Social Specialist Study is but one component of the broader EIA process and should not be misquoted to reflect the PPP that was followed as part of the NEMA compliant process undertaken by the EAP.

2.14.4 The first appellant mistakenly assumes that the PPP was flawed and therefore further assumes that, for this reason, the impact on farming activities would have a knock-on effect on the farm labourers. The PPP was comprehensive with specific focus group meetings held with landowners as well as the communities (labourers). The potential negative impact of this gas production project on the current agricultural activities has been specifically mitigated through numerous measures put forward including but not limited to the following:

- Landowners must be consulted, and all reasonable requests complied with. A written landowner agreement should be negotiated and concluded prior to commencement. Should this not be possible, a record should be kept of reasonable negotiations with the landowners.
- Ensure that as much of the infrastructure as possible is sited away from agricultural lands. Where work in agricultural land is unavoidable this must be compensated accordingly, completed quickly and infrastructure placed underground as far as possible to allow continued land use post construction.
- The identified drill site should, where possible, not infringe on the landowners' surface activities. Where impacts on landowners' surface activities are unavoidable this must be compensated accordingly, completed quickly and infrastructure placed underground as far as possible to allow continued land use post construction.

2.14.5 It is important to note that the Xhariep district is a minimum of 120km from the application area and does not adjoin the Masilonyana or Matjhabeng Local Municipalities within which the application area is located. It is therefore unclear on what grounds the FSGC should have been

pre-emptively identified and notified of this EA application. Based on their records, no members of the FSGC requested to be registered or involved in this application process at any time. Those community members with a potential to be impacted by the project were consulted throughout the application process as evidenced by the focus group meetings held with the communities during the Scoping and EIA Phase (refer to Appendix 3 of the Final EIAr).

2.14.6 The second appellant's claim that the "project proponent is a member of the United Nations Global Compact" is misdirected as while they (the applicant) do not apply the principles of the United Nations Global Compact, the applicant is not a formal member.

2.14.7 Whilst the grounds of appeal are directed at the DMRE, it is the opinion of the EAP and the applicant that the rights of the landowners and occupiers have been a focus of the identification of impact and mitigation measures presented in the Final EIAr. In addition, the Final EIAr has taken into consideration the following international standards and guidelines which aim to, among other, protect human rights:

- IFC Performance Standards applicability to this project
- WB Environmental Health and Safety Guideline for Liquified Natural Gas Facilities
- IFC EHS Guidelines for Onshore Oil and Gas Developments
- IFC Environmental Noise Guideline
- GHG and Climate Change International Agreements and Guidelines

2.15 In response to the second appellant, the applicant submits that:

2.15.1 In setting out the context of the social environment within which the Cluster 2 project falls, the FEIAR identified the project affected Wards which is the basis for identifying which Ward Councillors were notified as pre-identified I&APs in order to utilise this level of local governance in assisting with disseminating the relevant project information to their constituents. The role of Ward Councillors is described as follows by the Peoples Assembly: "*Ward councillors are a critical cog in local government. They are accountable to their ward and to the municipal council. Councillors are meant to live in the areas that they serve in order to ensure that there is genuine understanding of the needs of the ward. Ward councillors are a representative conduit between the communities they represent and the municipal council, reporting back regularly through*

ward meetings and assisting the community in identifying needs and priority areas of development which feed into the municipality's planning processes."

2.15.2 The second appellant references the poverty, education and basic services statistics which were included in the FEIAr to describe the baseline receiving environment within which the project is located (Section 9 of the FEIAr). No further response is required to this item.

2.15.3 The second appellant refers to the list of "66" "parent farms" in the FEIAr (presumably this is in reference to the list contained in Table 5, page 24 of the FEIAr). The second appellant does not however refer to the extensive list of farm "portions" contained in the same table which is presumably an attempt by the second appellant to selectively reference certain information to reinforce their pre-existing views and justify the latter statements that insufficient consultation was undertaken.

2.15.4 The second appellant's second reference is to Section 8.1 of the FEIAr which contains a highly summarised "General Approach to Public Participation". As the second appellant is of the legal fraternity, they should be well versed in the limitations of an EAP providing "personal information" of I&APs in the public domain in terms of the Promotion of Personal Information Act, 2013 (Act No. 04 of 2013) (POPIA). If the second appellant had submitted a request for additional detail on the PPP prior to the appeal (which for the record the second appellant did not do), the EAP would have been able to provide the second appellant with the number of individual I&APs recorded on the database in various categories as follows:

2.15.5 Whilst the general public (including NGO's) could not be provided with I&AP personal information due to POPIA, the CA was provided with such information and therefore had at their disposal the information on the public participation in order to make an informed decision.

2.15.6 The second appellant makes reference to "posters referred to were put in place for 4 days from 16 to 19 May 2022" and to clarify this statement in the FEIAr, due to the sheer number of posters (78 in total), it took a total of 4 days to physically erect them all within and around the application area. The majority of the posters remained in place for the duration of the application process (i.e. in excess of 6 months). The landowners were pre-identified and recorded on the I&AP database and were sent faxes, emails, SMS's and registered letters where relevant to inform

them of each stage of the application process and opportunities to participate. Furthermore, a total of 134 dwellings were recorded in and around the study area as part of the EIA process.

2.15.7 The second appellant makes reference to the number of attendees during the Scoping Phase meetings. It should be noted that similar meetings were also held during the EIA phase with a similar attendance level. The second appellant goes on to state *"These number contrast significantly with the number of people living in the affected municipalities according to the FEIAR"* however if one considers the surface area of the two municipalities (1,232,551 hectares) compared to the surface area of the application area (27,500 hectares), the application area accounts for ~2% of the two affected Local Municipalities. Furthermore, the application area does not include any urban areas with higher density of occupation and therefore would not be expected to account for a high proportion of the total population of the two affected Local Municipalities. As such, this line of reasoning by the second appellant has very little to no merit.

2.15.8 The second appellant states *"it appears from the minutes that no documentation was handed out at the meetings"* however if the second appellant had reviewed the minutes contained in the Appendix 3 of the FEIAr it was clearly stated "All attendees were informed that a hard copy of the Environmental Impact Report was available at the venue, Background Information Documents (BIDs), Comment forms and registration forms. I&APs were also informed that all the documents were available on the EAP's website should they want to access them digitally. I&APs were encouraged to submit their comments and concerns through filling in the questionnaires provided."

2.15.9 The second appellant's statement that "*Tetra4 has fallen foul of its obligations regarding consultation under NEMA…*" is unfounded.

2.15.10 The overwhelming feedback from community members who participated in the consultation process was that they were eagerly anticipating the commencement of the project as any additional work opportunities would be welcomed (refer to minutes of community meetings contained in Appendix B8.1 of the Public Participation Report). The employment of those occupiers of farms that work for the landowners would only be at risk by this project should the

landowners suffer financially as a result of this project and therefore compensation to the landowners is to be provided.

2.15.11 The consultation process undertaken was extensive and went far beyond the "basic" consultation requirements as specified in the 2014 EIA Regulations. Where the 2014 EIA Regulations require 1 site notice, a total of 78 site notices were placed. Where the 2014 EIA Regulations do not specifically require meetings, a total of 4 meetings were held during each phase of the application. The EAP (on behalf of the applicant) made every effort to bring the project to the attention of potential I&APs. However, it is not within the EAP or the applicant's power to ensure that every "potential" I&AP makes the effort to participate in the process.

2.15.12 The second appellant's statement that *"...persons working and/or living on the affected farms were not identified by Tetra4, ... and it made no arrangements to consult with them specifically"* is materially false. The second appellant's statement that: *"In relation to the EIA phase there was no evidence of consultation before the First Respondent"* is materially false above and furthermore as detailed in the Public Participation Report contained in Appendix 3 of the FEIAr.

2.15.13 The interpretation of the second appellant of the referenced statutory provisions is clearly misleading and out of context, and for the reasons set out above should be totally disregarded.

EVALUATION

2.16 The issue for determination is whether the applicant satisfied the requirements of PPP as contemplated in Chapter 6 of the 2014 EIA Regulations. In particular whether potential I&APs were adequately consulted during the EIA process. I have considered the numerous contentions that the appellants have made in support of this ground of appeal, as encapsulated above, as well as the applicant's submissions in response thereto. I have also considered the record of information and the regulatory framework as follows:

2.16.1 The requirement to consult with I&APs accords with the principles of NEMA, as set out in section 2 to of the Act. Subsection (2) of section 2 of the Act provides that "*Environmental Management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably*". Moreover,

subsection (4) (f) of section 2 of the Act provides that "the participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured".

2.16.2 It is settled law that an obligation to consult demands only that the person who is entitled to be consulted be afforded an adequate opportunity to exercise that right. It is only if that right is denied that the obligation to consult is breached. This principle was iterated by the Supreme Court of Appeal in the case of Minister of Home Affairs and Others v Scalabrini Centre and Others 2013 (6) SA 421 (SCA).

2.16.3 The purpose and objective of the public participation provision in terms of NEMA is to, among other, afford people the opportunity to express their views on matters affecting them. This principle was reiterated by the Constitutional Court in the case of Fuel Retailers Association of SA (Pty) Ltd v Director General, Environmental Management Mpumalanga and Others CCT 67/06 (2007) ZACC 13 (Fuel Retailers Case).

2.16.4 To give effect to section 2 of NEMA, the 2014 EIA Regulations require compliance with specific public participation requirements. In particular, regulation 41(6) stipulates that the person conducting the PPP must ensure that participation by potential or registered I&APs is facilitated in such a manner that all potential or registered I&APs are provided with a reasonable opportunity to comment on the application or proposed application. These provisions are written in peremptory terms.

2.16.5 Moreover, regulation 41(2)(b) of the 2014 EIA Regulations provides as follows:

"(2) The person conducting a public participation process must take into account any relevant guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of an application or proposed application which is subjected to public participation by-

fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of- (i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and (ii) any alternative site;

(b) giving written notice, in any of the manners provided for in section 47D of the Act, to-

(i) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;

(ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;

(iii) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;

(iv) the municipality which has jurisdiction in the area;

(v) any organ of state having jurisdiction in respect of any aspect of the activity; and

(vi) any other party as required by the competent authority".

2.16.6 In terms of regulation 43(1) of the 2014 EIA Regulations a registered I&AP is entitled to comment, in writing, on all reports or plans in respect of the EA application and to raise any issues which they believe may be of significance in the adjudication of the EA application.

2.16.7 Further to the above, regulation 23(1)(a) of the 2014 EIA Regulations states that *"The applicant must within 106 days of the acceptance of the scoping report submit to the competent authority an environmental impact report inclusive of any specialist reports, and an EMPr, which must have been subjected to a public participation process of at least 30 days and which reflects the incorporation of comments received, including any comments of the competent authority."*

2.16.8 The information before me indicates that there was a *Call to Register* which preceded the Scoping Report availability and involved the placement of 78 site notices in and around the application area (locations provided in the report), this being substantially more than the prescribed 1 site notice as required by NEMA. Additionally, newspaper advertisements were placed in the Vista Newspaper on 19 May 2022 (in 3 languages) and a notice was placed in the Free State Provincial Gazette on 01 July 2022 (in 3 languages). All notifications for each phase of the project were distributed in English, Afrikaans and Sesotho (the predominant

languages in the application area and surrounds). Faxes, e-mails, SMSs and registered letters were sent to all registered I&APs during each notification event. The scoping report and associated appendices were made available for public review and comment from 30 July 2022 to 30 August 2022 at Virginia public library and Welkom public library.

2.16.9 Furthermore, during both the Scoping Phase and EIA Phase public participation process, a public open day (Scoping Phase) and public meeting (EIA Phase) were held along with separate focus group meetings with the communities (occupiers of the farms in and around the application area) and separate focus group meetings were held with the landowners.

2.16.10 I also took note of the Comments and Responses sheets which were to the DMRE prior to a decision to issue the EA being reached.

2.16.11 Having regard to the PPP conducted by the applicant described in section 8 of the FEIAr and the PP report, I am not persuaded that there is evidence that all potential I&APs were not afforded adequate opportunity to submit comments on the EIAr submitted by the applicant in support of the application for EA. I am accordingly satisfied that the PPP conducted as part of this application by the applicant complied with and met the requirements of the 2014 EIA Regulations.

2.16.12 For the above reasons, this ground of appeal is dismissed.

Fourth Ground of Appeal: Failure to consider and assess the socio-economic impacts of the EA

2.17 The first appellant submits that:

2.17.1 The socio-economic impacts on farmers, their employees and the surrounding community identified in the ESIA should have been given extensive consideration by the DMRE on account of the history of poverty in South Africa as well the communities surrounding the proposed project area. This is evidenced by the SAMPI scores which indicate that the community of Masilonyana, in particular, is becoming poorer and more poverty stricken.

2.17.2 The ESIA attempts to address this through the economic impact assessment which states that the applicant's operations are likely to span two economic generations and that this type of longevity allows local economies to step up their economies over a long period of time. The economic impact assessment further attempts to enforce the narrative that the project would benefit the local economy by referencing articles from News24 and OFM which highlight the need for investment into the communities surrounding the project area as well as stating that Tetra4's expansion could cover the social grants for over 100 000 South Africans and would lead to an additional of 1 218 jobs. However, the reality is that over 40% of the jobs will be for highly skilled individuals and the report states further that it can be concluded that Tetra4 ought not to be viewed as a direct, major employer of semi and unskilled workers. With only 8.6% of Matjhabeng and 4.4% of Masilonyana having an education qualification above grade 12 it is highly likely that large amounts of in-migrants looking for jobs will enter the surrounding areas which will lead to the oversupply of labour. This then results in large informal settlements which will add pressure to an already struggling municipality to provide social services.

2.17.3 Given that not many local communities will directly benefit from the project, the impact on the social fabric of the region needs to be considered. The surrounding communities are close-knit and rely heavily on farming as a way of life and as a way of sustaining their livelihoods. This project poses a direct risk to this way of life and livelihoods as farmlands will not be farmed while construction takes place which will lead to decreased yields, and the value of the surrounding farmlands are likely to be impacted due to the establishing of wells, pump stations and gas-pipes across a wide area of farmland. With decreased production and ever-decreasing land values, farmers could be forced to sell their land which meets the International Finance Corporation (IFC) definition of economic displacement or, at the very least, will not be able to maintain the paying of wages to workers which will lead to additional job losses and would lead to issues around housing as farmworkers also live on the land.

2.17.4 In addition, the project will permanently alter the sense of place which refers to an individual's personal relationship with his/her local environment, both social and natural, which the individual experiences in his/her everyday daily life. It is highly personal, and once it is affected, it cannot be restored. Part of the sense of place is the emotional attachment that the farmers have to their properties, and the hopes that they have for it to serve future generations (their children).

2.17.5 In light of the above, the social license to operate is negatively compounded by the fact that extreme uncertainty exists around the project as farmers are the holders of surface rights, whilst the applicant holds the production rights. This means, that according to the MPRDA, the applicant can give the landowner 21 days' notice, and then continue with their production activities, despite objections from the landowners. This is a cause of uncertainty and tension amongst the farmers, since they feel that they have no control over or say in what will happen on their property.

2.18 The second appellant submits that:

2.18.1 The Free State is described as the breadbasket of South Africa. The Lejweleputswa Integrated Development Plan ("Lejweleputswa IDP") notes that the Free State supplies a significant portion of the country's agricultural produce. Of this agricultural produce, maize is the main product farmed in Lejweleputswa, though it must be noted that there is a diversity in farming activities in the region.

2.18.2 Agriculture is a vital industry. It is a renewable economic activity that provides food security, is a source of employment, contributes towards GDP through exports and it serves as a vector for rural development. During a climate emergency, the critical importance of the agricultural sector cannot be overstated.

2.18.3 The Lejweleputswa IDP acknowledges the importance of agriculture and states that"...it is therefore important to protect agricultural land from being transformed into urban related areas...an advantage of this industry is the snowball effect it creates by way of agro-processing and tourism."

2.18.4 The Lejweleputswa IDP further links to the Free State Growth and Development Strategy 2012, which provides for "inclusive economic growth and sustainable growth creation." There are further linkages made to the Free State Provincial Spatial Development Framework, which aims to promote the agricultural industry in the Free State.

2.18.5 The proposed project will have an adverse impact on this agricultural sector. The Social Impact Report attached to the FEIAr finds that *"(t)here is a possibility that Tetra4's activities will cause economic displacement for some of the affected farmers. The actual impact on their livelihoods must be assessed by an agricultural economist and compensation must be done according to international best practice."* There is, however, no assessment by an agricultural economist in the FEIAr. Despite this recommendation there is no assessment by an agricultural economist in the FEIAr.

2.18.6 The EIAr, noting that the proposed project will have a detrimental effect on the agricultural industry, states that "High sensitivity crop field areas were identified by means of the DEA Screening tool (2022) which is not expected to be avoided throughout the life of the operation." It goes on to state that" Therefore, stakeholder engagement must be undertaken to compensate landowners for high crop field land use areas where necessary." No reference is made to compensation offered to people living and/or working on farms, however, who are a vulnerable group more susceptible to the adverse impacts of the proposed project on their homes and livelihoods. Compensation for the loss of high crop field areas to landowners is the tip of the iceberg.

2.18.7 At page 13 of Appendix B7 to the Public Participation Report, a landowner raises several concerns pertaining to the Scoping Report's underestimation of the impacts of erosion, the impacts of drilling in arable fields and wildlife camps, the impacts on groundwater and water quality and the economic impact on landowners. The response by the EAP to the concerns raised by the landowner is "We therefore confirm that we have taken note of your comment and the list of impacts you consider underestimated and will share this with our specialists for them to consider your inputs and re-evaluate their findings where relevant. The impact assessment presented in the Scoping Report is a preliminary assessment and your comments are considered extremely valuable in helping us focus on the impacts that require more detailed interrogation and whether suitable mitigation measures that are both feasible and acceptable to affected landowners can be put in place."

2.18.8 The expert report of Dr Steven Campbell (Annexure A1) found that due to gaps and flaws in the applicant's computer modelling and contamination simulations, the applicant has not reliably forecasted impacts to groundwater resource abundance and water quality. (Indeed, he

found that the information is so unreliable that the competent authority is unable to assess the proposal.) Without an adequate assessment of the impacts of the proposed project on water quantity and quality, including methane migration and impacts, the impact on downstream users, particularly of the underlying Karoo aquifer which is the source of most regional groundwater supply for people, livestock and agriculture, have not been assessed.

2.18.9 The second appellant submits that the applicant has all but ignored the fact that agriculture is a key economic activity in the district when in fact it was required to assess the impact of the proposed project on it.

2.18.10 The applicant's Social Impact Assessment acknowledges the economic displacement of farmers. It states that *"Any aspect that impacts on the ability of a farmer to make a living from his/her land can be seen as an impact on his/her livelihood"* and" Due to the lack of information and timeframes, the farmers are uncertain about how long their fields will be occupied and how permanent the impact will be. They will lose the income generated by the specific field, which in some instances where the farmers are impacted by a lot of wells and trenches, forms a significant part of their income. This meets the International Finance Corporation (IFC) definition of economic displacement.

2.18.11 The economic displacement of farm owners is tied to the economic displacement of people living and/or working on farms. They constitute an already vulnerable community. They depend on farm owners for their income and their livelihoods. The displacement of farm owners leads to farm dwellers and workers losing their jobs, their livelihoods and their homes.

2.18.12 The applicant's Social Impact Assessment states: *"Although the Tetra4 project will have a positive economic impact in South Africa, the direct benefit for the local communities is limited. The job creation benefits, both primary and secondary are not significant."*

2.18.13 The second appellant submits that the proposed project will worsen unemployment and poverty in the region. The Lejweleputswa District Municipality's IDP for 2021- 22 records that 88 395 people are employed in the agricultural economy in the district. The applicant has not assessed the impact of the proposed project on existing jobs and livelihoods associated with the

agricultural sector. This is a significant gap in the information before the DMRE made its decision.

2.18.14 Furthermore, the Economic Impact Assessment equally does not make mention of the impacts that the proposed project will have on the tourism sector, which is one of the leading sectors in the Free State and in the Matjhabeng Local Municipality in particular. With the decline in the mining sector the Masilonyana Local Municipality plans to turn its focus on tourism. The municipality prides itself on its tourism destinations. The Lejweleputswa District Municipality's IDP for 2021- 22 records that 6500 people are employed in the tourism sector in the district.

2.18.15 Despite the fact that on the applicant's version, "*Social impacts can therefore range from significant health impacts to the loss of a cherished landscape and associated loss of a sense of place. The spirit of place associated with an area is an important factor in tourism and hunting and the marketing of these activities.... The project will permanently alter the sense of place*" the economic impact of the proposed project on the tourism sector in the area was not assessed.

2.18.16 The paucity of information in the FEAIr and its specialist reports of the proposed project's impact on tourism falls foul of our law as it should be a consideration that was assessed in the specialist reports.

2.18.17 It is the second appellant's submission that because of the adverse impact that the proposed project will have on the agricultural sector (including the exacerbation of food insecurity, the displacement of livelihoods and the lack of job creation for local communities), and on the tourism sector the proposed project will further entrench poverty, unemployment and inequality within the region.

2.18.18 In the reasons given for granting the EA, DMRE states that "...the no-go alternatives were considered during the EIA process" Without an assessment of the adverse economic impacts of the proposed project, a meaningful discussion of energy alternatives such as renewable energy and the potential benefits of the no- go alternative, this cannot be said to be the case, however.

2.18.19 The second appellant submits that DMRE's EA was taken while material provisions prescribed by NEMA were not complied with and with DMRE not having taken relevant considerations into account. The appellant submits that DMRE's EA should be set aside.

Applicant's Response

2.19 In relation to the first appellant's grounds of appeal, the applicant submits that:

2.19.1 Whilst this ground of appeal is directed at the DMRE, it is their (the applicant's) assertion that the socio-economic impacts were adequately assessed with sufficient mitigation measures put forward to wholistically address these impacts. The various Social Impact Assessment Report extracts presented by the first appellant in this ground of appeal are selected out of context and without considering the overall SIA and Economic study findings and mitigation measures which, as per the conclusion of both studies were deemed to be acceptably mitigated.

2.19.2 Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably (section 2(2) of the NEMA).

2.19.3 This principle was fully assessed and addressed by the applicant and totally considered by the CA.

2.19.4 As appears from their EA application and the reasons for DMRE's decision to grant the EA:

- Tetra4 has implemented and is implementing various socially upliftment programmes;
- Tetra4 has taken various steps insofar as the availability of education for the previously disadvantaged is concerned;
- Tetra4 has implemented and is continuing to implement various social projects from which the communities in the vicinity of the project are benefiting; and
- the granting of the Environmental Authorisation will have an absolute positive impact not only on the various persons employed by Tetra4 but also on the surrounding communities.

2.19.5 These considerations were taken into account for a proper exercise of the statutory power of the DMRE, and in the applicant's opinion granted the EA based on relevant, substantiated and justifiable reasons.

2.19.6 Furthermore, it is important to also consider the sustainable development principle: development (which essentially covers any human activity, including the production of gas activities by the applicant) must be socially, environmentally and economically sustainable (section 2(3) read with section 4(a) of the NEMA).

2.19.7 In the context of this sustainable development principle, the approach is that any adverse impacts should be avoided, or, where they cannot be altogether avoided, should be minimised and remedied: in other words, the environmental duty on the applicant is one of avoidance and not one of guaranteeing that there will be no adverse impact whatsoever.

2.19.8 In this regard it is repeated that, according to the applicant's EA application and the reasons for the DMRE's decision to grant the EA, all proposed mitigation measures were regarded as adequate by the DMRE. We respectfully submit that the activities of the applicant are therefore environmentally sustainable.

2.19.9 The granting of the EA will have the result that the applicant can continue to make the social contributions that it made so far and will therefore not compromise the much-needed social sustainability, and effectively continue an enterprise which contributes significantly to the national economy, amongst others by making significant annual tax contributions.

2.19.10 In terms of the impact assessment principle: the social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment (section 2(4)(i) of the NEMA).

2.19.11 In our view, the DMRE clearly followed a thorough approach in assessing and considering the EA application, which approach is consistent with the impact assessment principle. Consequentially, we respectfully submit that on upon a proper application of these and

other national environmental management principles, the granting of the EA is justified and constitutes the correct administrative decision.

2.19.12 The argument is made that the DMRE should have given extensive consideration to poverty in South Africa and the argument further references the South African Multidimensional Poverty Index (SAMPI) statistics presented in the SIA report. These statistics were included in the SIA report (Section 5.2 Description of the Population) in order to give context to the existing poverty in the region. As such, it is assumed that the DMRE was in possession of the relevant information regarding poverty in the region in order to holistically apply their mind.

2.19.13 The socio-economic impacts of the project have been identified and assessed in the F EIAr (refer to relevant subsections in Section 10 of the FEIAr as well as the Social and Economic Impact Assessment Reports included in Appendix 4 of the FEIAr). The specialist assessments concludes that the positive impacts can be enhanced while the negative impacts can be mitigated with the implementation of management and mitigation measures. It is further noted that the Cluster 1 /Phase 1 project has been constructed and operating since ~2018 and at no time was there a loss in productivity as a result of these activities evidenced. The impact on sense and spirit of place was identified and assessed in the FEIAr (refer to Sections 10.2.1.4 and 10.2.2.4 as well as Table 57 in Section 10.3).

2.19.14 Section 54 of the MPRDA makes provision for a dispute resolution process to be followed and furthermore makes provision for fair compensation to be determined in the event that the landowner is likely to suffer loss or damage.

2.19.15 The selected references from the ESIA specialist reports to claim that this project will have significantly negative impacts on the socio-economic environment is misleading and fails to consider that the Social Impact Assessment specialist report goes on to mention that "*Through its contribution to the economy, the Tetra4 project will assist with achieving the goal of creating an economy that will create more jobs*" (Section 4.2.3, Page 31). The focus by the first appellant on the possible negative impacts in terms of spirit of place being lost and the social licence to operate in terms of the MPRDA does not appear to have considered the proposed mitigation measures put forward to ensure that these impacts do not materialise in a significant way.

2.20 In response to the second appellant's appeal, the applicant submits as follows:

2.20.1 The impact on existing livelihoods was assessed in the Social Impact Assessment and the recommendation for an agricultural economist input is as follows (SIA Table 12): *"In cases where there the farmer does not agree with the compensation offered by Tetra4 related to loss of potential income due to exploration, construction or operational activities, Tetra 4 must appoint an agricultural economist at their cost to determine what the actual losses will be to the farmers due to the drilling and trenching activities on their properties. Farmers must be compensated for the actual losses for the entire period that they cannot use the land due to Tetra's activities. This may be one or two years, depending on when in the season the drilling and trenching take place, and how long the property is affected. The principles explained in the IFC Handbook for Preparing a Resettlement Action Plan must be followed. This includes a land use/land capability inventory; an asset register and physical asset survey; an income stream analysis and entitlement matrix. Compensation must be determined with input from the landowners."* This assessment by an agricultural economist cannot be undertaken on a high level as it is highly dependent on the particular farm, what crops are being grown or planned to be grown, the season within which the impacts materialise, etc. This requirement for the involvement of an agricultural economist is therefore included in the EMPr (Appendix 5 of the Final EIAr) and is to be implemented once the project construction commences.

2.20.2 The second appellant is referring to a Scoping Phase comment by an I&AP and not an EIA Phase comment. The purpose of the Scoping Phase is to provide the public with the preliminary (high level) assessment of the preliminary list of impacts and to solicit comments. These comments on the Scoping Phase are then considered in the compilation of the EIA Phase report. It is for this reason that the EAP's response to the I&AP stated such. The comments by the landowner were provided to the relevant specialists for their consideration in the formulation of adequate mitigation measures.

2.20.3 The impacts of the project on existing agricultural activities were assessed in the Social Impact Assessment Report, Economic Impact Assessment Report and Soils and Agricultural Impact Assessment Report (Appendix 4 of the FEIAr). Each specialists' findings and mitigation measures relating to the impact on landowners and agriculture are included in the FEIAr and

the EMPr. Mitigation measures relating to protection of agriculture in the EMPr are extensive however a small sample is provided below for ease of reference:

- Landowners must be consulted, and all reasonable requests complied with. A written landowner agreement should be negotiated and concluded prior to commencement. Should this not be possible, a record should be kept of reasonable negotiations with the landowners. Ensure that as much of the infrastructure as possible is sited away from agricultural lands. Where work in agricultural land is unavoidable this must be compensated accordingly, completed quickly and infrastructure placed underground as far as possible to allow continued land use post construction. The identified drill site should, where possible, not infringe on the landowners' surface activities. Where impacts on landowners' surface activities are unavoidable this must be compensated accordingly, completed quickly and infrastructure placed underground as far as possible to allow continued land use post construction. The location of the drilling site should be done so as to impact minimally on the daily activities of the landowner. The location of the site should be consulted and agreed with the landowner. As far as possible, exploration wells should be constructed (drilled) outside of existing cultivated lands. Where this is not possible, the final production well concrete bunkers must be located outside of cultivated lands and the borehole and connecting pipeline must be at least 1.5 m below surface to prevent interference with crop production activities.

2.20.4 The current Nature Tourism locations within the Lejweleputswa District Municipality (LDM) Integrated Development Plan (IDP) are not located within the application area however the LDM IDP identifies Special Interest Tourism in the form of "Mining tourism forms part of this category and is found in Odendaalsrus, Welkom and Virginia (IDP, Section 13.4, page 60). The Tetra4 gas production operations are located within this Special Interest Tourism area and are therefore complimentary to the IDP especially considering that this represents the first onshore gas production project in South Africa.

EVALUATION

2.21 In evaluating this ground of appeal and the responses thereto the issue for determination is whether the CA adequately considered the socio-economic impacts of the proposed project, in

the granting of the EA. I have considered the numerous contentions that the appellants have made in support of this ground of appeal, as encapsulated above, as well as the applicant's submissions in response thereto. I have also considered the record of information. I find as follows:

2.21.1 I note that the applicant submitted a Social Impact Assessment report (SIA report) by a specialist in support of the application for EA, subject to this appeal. The socio-economic impact of the gas project is assessed in paragraph 7.3 of the SIA report, and the specialist identified suitable mitigation measures.

2.21.2 Following the SIA, I note the conclusions by the specialist that the potential impact on the livelihoods of some of the directly affected farmers may be severe. Furthermore, it is concluded that this will have a spinoff impact on farm workers, food security and the local economy. Every possible measure must be implemented to ensure that the production of the farmers is not permanently impacted. It is also the conclusion by the specialist that the project can only be recommended if the livelihood impacts are mitigated and managed successfully.

2.21.3 According to regulation 23(4) of the 2014 EIA Regulations, Appendix 6, the specialist report must contain the description of the findings and potential implications of such findings on the impact of the proposed activity, and mitigation measures for inclusion in the EMPr.

2.21.4 I have noted that the mitigation measures identified in the SIA report are included in paragraph 5.1.3 of the EMPr as contemplated in section 23(4) of the 2014 EIA Regulations, read with Appendix 6 thereof.

2.21.5 In view thereof, this ground of appeal is without merit and accordingly dismissed.

Fifth ground of appeal: Need and desirability assessment

2.22 The first appellant submits that:

2.22.1 The need and desirability within the context of ecologically sustainable development should give consideration to the potential impacts of the proposed exploration for new onshore oil and

gas resources throughout its life cycle (rather than ring-fencing the consideration of need and desirability to the exploration well drilling phase only).

2.22.2 It is artificial to consider the need for and desirability of undertaking the proposed exploration activities without considering the impacts associated with further production activities which are intended to materialise from successful exploration. The only reason that Rhino Oil wishes to undertake exploration is to discover reserves, which can be exploited.

2.22.3 As confirmed in the judgment of the Eastern Cape High Court in *Sustaining the Wild Coast and Others v Minister of Mineral Resources and Energy and Others*, the processes are discrete stages that culminate in the production and combustion of oil and gas, and the emission of greenhouse gases that will exacerbate the climate crisis and impact communities' livelihoods and access to food. The court also confirmed that a comprehensive assessment of need and desirability of exploring for new oil and gas reserves from climate change and the right to food perspectives is relevant to a decision to authorise seismic survey activities.

2.22.4 A balanced and proper assessment of need and desirability requires considering both the positive and negative impacts of the full chain of oil and gas exploration and production.

2.22.5 The FEIAr justifies the exploration activities on the basis that gas production is needed and desirable. The need and desirability analyses repeatedly reference the benefits South Africa's economy would reap from production of oil and gas:

"*At just 2.6% of the country's total energy mix, South Africa's natural gas market is small, but with all its inherent benefits, it has the potential to completely change the economy by stimulating economic growth and development, stability, and job creation. The meaningful addition of natural gas to the country's energy mix will rejuvenate an overburdened, out-dated energy infrastructure and reduce cyclical energy shortfalls. Perhaps even more importantly, it will stimulate the economy by allowing business and industry to lower their energy and operational spend while also creating significant numbers of new jobs and skills development opportunities*" and

"One way of breaking this impasse is to create significant "anchor" gas demand through the development of a gas-to-power programme. In pursuit of adding generating capacity, lowering carbon emissions, enhancing energy security and supporting industrial development, South Africa has taken the first steps in a gas-to-power programme to be executed under the Integrated Resource Plan 2019, aiming to increase the national energy mix natural gas contribution from 2.6% to 15.7% by 2030."

2.22.6 Furthermore, the FEIAr notes that:

"*Natural gas is therefore seen by many in the country as a "bridging" source of energy because it emits almost 50 % less CO2 than coal. Considering only tailpipe emissions, natural gas is 15-30 % cleaner than fuel when it is burned. Thus, if SA converts its coal fired stations to natural gas tomorrow, it will save a considerable amount of GHG emissions. Thus, natural gas is certainly a cleaner energy source than coal, and therefore relative to coal, must be considered as more desirable in this context. Economically, common sense does indicate that natural gas offers an interim solution for the climate change target challenges in SA in the short to medium term. That stated, an economic need and desirability assessment must consider the current generation, and although not discounting future generations, the economics of gas production in SA at present has a strong case. In terms of helium, Helium cannot be extracted without the natural gas (methane) and while natural gas may be replaced or phased out in future, the natural gas will still be extracted to extract helium. The importance of helium both locally and globally as well as the high concentrations of the helium in this particular gas resource provide strong motivation for the need and desirability of this project despite the natural gas being extracted too."*

2.22.7 However, the FEIAr fails to consider the negative impacts of long-term oil and gas production, and downstream activities. Instead, the reports portray the ostensible benefits of production and downstream activities, including electricity supply, but does not consider the significant time lag when commercial production would be achieved. By the time any resources discovered in the subject exploration block are ready for production, South Africa will have already needed to transition to renewable energy sources if the country intends to adhere to its international climate commitments. Oil and gas will not be as beneficial to South Africa's economy as the

ESIA claims in its need and desirability assessment. It therefore biases the evaluation of need and desirability in favour of the proposal.

2.22.8 Holistic Lifecycle Oversight Omitted: The DMRE's approach disregards the comprehensive assessment of oil and gas exploration's full lifecycle, limiting consideration solely to the initial drilling phase and neglecting the potential long-term negative effects of production and combustion of fossil fuels.

2.22.9 Neglecting Climate Impact: By ignoring the broader climate implications, the DMRE fails to account for the greenhouse gas emissions resulting from oil and gas exploitation. This omission undermines the effort to address the climate crisis and its subsequent adverse effects on communities, livelihoods, and food security.

2.22.10 Incomplete Need and Desirability Analysis: The need and desirability assessment lacks a balanced evaluation of both positive and negative impacts throughout the entire oil and gas exploration and production chain. The DMRE's oversight hampers a comprehensive understanding of the project's environmental implications.

2.22.11 Economic Bias Over Climate Considerations: The DMRE places undue emphasis on the economic benefits of oil and gas production, failing to adequately weigh the long-term climate repercussions. These bias tilts the assessment towards economic interests while neglecting the urgency of transitioning to renewable energy sources to meet international climate commitments.

2.22.12 Ignored Transition to Renewable Energy: The DMRE's approach fails to acknowledge the evolving energy landscape and South Africa's future commitment to renewable energy sources. By focusing on fossil fuel exploitation, the assessment disregards the necessity of shifting away from oil and gas in favour of sustainable and climate-friendly alternatives.

2.22.13 Undervaluing Helium Extraction's Impact: While emphasizing the importance of helium extraction, the Director General fails to consider the feasibility and urgency of extracting helium through alternative, environmentally friendly means, thereby diminishing the imperative of considering the negative consequences of natural gas extraction.

2.22.14 In conclusion, the DMRE's failure to account for climate implications and apply the precautionary principle reflects an incomplete and biased assessment that inadequately addresses the potential environmental harm and long-term consequences of oil and gas exploration and production. This approach neglects the urgent need to mitigate greenhouse gas emissions and transition to more sustainable energy sources. Therefore, the DMRE failed to adequately consider and take into consideration all relevant factors in particular those regarding the pollution, environmental impacts or environmental degradation "likely to be caused if the application is approved.

2.22.15 The need and desirability assessment assumes that the use of natural gas can serve as a transition fuel to assist the country in meeting its climate change commitments. Chapter 6 of the EIAr, particularly 6.2.3 seeks to make the case for the use of natural gas as a transition fuel. In addition to its potential use in peaking plants (in place of diesel currently used), reference is made to the IRP2019, highlighting that while the capacity allocations see a significant increase in renewables and a decrease in hydrocarbons (coal, oil and gas), 'the IRP2019 acknowledges that gas-to-power technologies are required to provide the flexibility required to complement renewable energy in the "just transition" to a net-zero and climate resilient society.

2.22.16 Reference is also made to DMRE policy relating to accelerating exploration of local resources, while in the short-term pursuing gas import options.

2.22.17 Recent independent studies challenge the view that fossil gas is necessary for electricity generation and as a transition fuel. These studies have not been integrated into the assessment.

2.22.18 While the increased use of gas as a 'transitional fuel' is promoted by government and vested interest groups, the increased use of gas (especially in electricity generation) will lead to increased emissions of climate warming GHGs, and methane (CH4) in particular. While natural gas combustion is less carbon-intensive than that of coal, fugitive emissions arising from the production, transport, storage and use of natural gas have a much greater climate impact than CO2. In particular, over a 20-year period (which is particularly relevant since the next 20 years are a critical window for addressing the climate crisis) methane emissions, which make up

approximately 70-90% of natural gas emissions, are projected to be 82.5 times as impactful as those of CO_2.

2.22.19 The desirability of using gas as a 'transitional' fuel is also questionable having regard to volatile international gas prices, as well as the potential risk of Carbon Border Taxes being introduced in the future. This risk will impose restrictions on the export of products with a high carbon footprint, putting South Africa's economy at greater risk of developing gas to power rather than clean renewable alternatives. This invariably diminishes the need and desirability for promoting new gas development projects, as the negative climate impacts and financial risks undermine the potential for gas to represent a viable solution for South Africa's ambitions to address development whilst respecting universal and regional climate change obligations. This is not considered in the I FEIAr.

2.22.20 Considering the lifecycle impacts of a gas to power plant, the use of natural gas (mostly methane) to generate electricity is likely to have a worse climate change impact than using coal, given the significant potential for leaks in the extraction and transportation of gas to a power plant.

2.22.21 It is incorrect of the EAP to have made the assumption that *"Gas is identified in the Integrated Resources Plan (October 2019) as significant contributor to South Africa's energy mix in the period up to 2030."* The IRP does not indicate a need for significant amounts of gas by 2030. The 2019 IRP, which is rooted in an outdated and scientifically and economically unsound understanding of the necessity for any gas in the energy mix, only projects the collective contribution of gas and diesel to the 2030 energy mix to be 1.3% combined. In any event, recent reports have suggested that even the 2019 IRP's small allocation of gas within the energy mix is more than will ever be required, and the 2019 IRP will likely need to be updated in the foreseeable future to align with South Africa's 2021 Nationally Determined Contribution under the Paris Agreement and to keep pace with quickly evolving science and significant reductions in price for solar and wind energy.

2.22.22 Additionally, impeding global north carbon border adjustment mechanisms will impose restrictions on the export of products with a high carbon footprint, putting South Africa's economy at greater risk should it develop gas to power electricity rather than clean renewable

alternatives. Investing in fossil fuel sources does not present a viable solution for South Africa's ambitions to address development whilst respecting universal and regional climate change obligations.

2.22.23 Two recent independent studies (among others) challenge the view that fossil gas is necessary for electricity generation and as a transition fuel.

2.22.24 The International Institute for Sustainable Development's (IISD) *Gas Pressure: Exploring the case for gas-fired power in South Africa* (March 2022) report points out that while there used to be a rational view that fossil gas would be necessary either during a transition to low-carbon energy or as part of the long-term energy mix for electricity production:

....revolutions first in renewable energy costs and then in battery storage costs have upended this view. Analysis of the South African electricity system shows that gas supply is not technically necessary until at least 2035, if ever. In the last few years, either the risks associated with gas have increased, or the understanding of existing risks has increased. Consequently, South Africa may see significant negative outcomes from developing a large gas-to-power system now... the trend toward decarbonization, coupled with cost reductions for renewable energy and storage, creates risks for gas investment. Investment in gas can reasonably be expected to lead to higher costs for consumers, just transition challenges for workers, and losses for investors.

2.22.25 The ISSD report highlights some of the risks associated with gas-to-power investment in South Africa. These risks include significant contributions to climate change (as a consequence of CO_2 and methane emissions when gas is burned), increasing international pressure to move away from gas due to climate impacts, financial risks linked with gas-to-power, the risk of reduced security of affordable gas supply, the risk of stranded assets, and the risk of creating an additional just transition burden (future gas workers and communities face a repeat of the transition hardships currently faced by the coal sector).

2.22.26 The Meridian Economics' *'Hot Air about Gas – An Economic Analysis of the Scope and Role for Gas-Fired Power Generation in South Africa'* (June 2022) report points out that while South Africa's large-scale use of gas appears to be central to current energy policy direction in South

Africa, *'this rests on a 2012 vision which pre-dates dramatic reductions in renewable energy costs and carbon emissions space'*. The report goes on to state that independent analysis of the power sector across multiple recent studies shows that South Africa's power needs can be met both now and in the future with very little use of gas, and that there is *'no evidence to support the large-scale gas envisaged in the GMP; this is uneconomical even before carbon emissions are considered'*. Meridian points out that *'the assumption that gas-fired power generation would replace coal ignores the fact that other technology combinations are now better at replacing coal-fired power than gas, and it is against these technologies that gas-fired generation should actually be compared'*. Meridian demonstrates that existing modelling provides no economic rationale for "big gas" in the power sector, and that *'the impact of using large volumes of gas to generate power will be borne by electricity consumers and will essentially be a subsidy provided by power consumers to otherwise unviable gas use in other sectors'*.

2.22.27 The Vital Ambition Report by Meridian Economics in collaboration with the CSIR Energy Centre ("Vital Ambition Report") states that gas to power is only justified in the South African energy mix in so far as it is required for low-utilisation flexible capacity (peaker plants) for balancing the system during peak power demand. The report confirms that no investments in gas infrastructure for energy production and generation is needed now or in the near future. Furthermore the 2019 IRP will likely need to be updated in the foreseeable future to align with South Africa's 2021 Nationally Determined Contribution under the Paris Agreement and to keep pace with quickly evolving science and significant reductions in price for solar and wind energy. However, even the 2019 IRP, which is rooted in an outdated and scientifically and economically unsound understanding of the necessity for any gas in the energy mix, only projects the collective contribution of gas and diesel to the 2030 energy mix to be 1.3% combined.

2.22.28 The use of fossil fuels must be phased out quickly due to the urgent need to address global warming. A recent study published in *Nature*, the world's leading multidisciplinary science journal, discovered that "by 2050, we find that nearly 60% of oil and fossil methane gas, and 90% of coal, must remain unextracted to stay within a 1.5 °C carbon budget." According to the study, "most regions must reach peak production now or within the next decade, making many operational and planned fossil fuel projects unviable." It is common practice that proposed exploration activities such as reconnaissance, only commence months and sometimes years

after the need and desirability assessment is undertaken, with extraction and production only commencing years later. According to one study, the world's largest oil and gas fields took an average of 5.5 years from discovery to first production and 17 years to reach peak output. Chevron Corporation's (CVX) Gorgon natural gas development project off the coast of Australia took 30 years to complete, and another six years to begin producing liquefied natural gas.

2.22.29 Therefore, exploration projects whose objectives are to locate gas deposits for energy companies to exploit through the construction and production of fossil fuels, run the risk of creating risks for such infrastructure to become stranded assets which invariably impacts on the development potential of South Africa in achieving its climate goals. With no economic justification for large-scale gas use in power, such a strategy would result in assets that are stranded before their first kWh of power is generated. Given this, the proposed reconnaissance project in no way provides a remedy nor will address in the immediate future South Africa's current energy insecurity issues.

2.22.30 The fundamental outcome of the need and desirability assessment should not be centred on the determination of whether gas technology will ensure security of supply for electricity. Instead, due to the climate crisis, this assessment should be centred on whether South Africa needs, or should rely on, gas to provide security of supply of electricity and whether alternative technologies could meet the same supply objectives with less harm and risk. Renewable energy and/or storage can replace gas to provide reliable and cost-effective generating capacity while greatly reducing the environmental and health risks associated with gas.

2.22.31 Unsubstantiated Transition Assumption: The DMRE assumes that natural gas can act as a transition fuel to meet climate commitments, yet recent independent studies challenge this premise. This oversight dismisses the rapidly decreasing costs of renewable energy and battery storage, which make the need for gas as a transition fuel questionable.

2.22.32 Neglecting Methane Emissions Impact: The DMRE fails to account for the substantial emissions of methane (CH4), a potent greenhouse gas, associated with natural gas production, transportation, and use and which poses a much greater short term climate change impact than CO2 emissions. Focusing solely on the carbon intensity of combustion misrepresents the overall climate impact of natural gas despite recent advancements in methane monitoring

technologies revealing that gas extraction produces higher methane emissions than previously estimated.

2.22.33 **Inadequate Lifecycle Impact Consideration**: The assessment overlooks the full lifecycle impacts of gas-to-power plants, including the cumulative greenhouse gas emissions associated with every step of the process and neglecting potential methane leaks during gas extraction and transportation from wells to the LNG plant. Therefore, the failure to comprehensively assess environmental consequences distorts the evaluation of gas's viability as a transition fuel.

2.22.34 **Misinterpretation of IRP and Gas Need**: The DMRE wrongly assumes a significant need for gas based on the Integrated Resources Plan (IRP), overlooking that the actual gas contribution projected in the IRP is minimal (1.3% combined with diesel). Recent reports further question the need for large-scale gas use in the energy mix.

2.22.35 **Economic Risks of Gas Investment**: The DMRE does not acknowledge the financial risks associated with investing in gas infrastructure. Studies show that gas investments may lead to higher consumer costs, stranded assets, just transition challenges, and losses for investors, particularly as renewable energy costs decrease.

2.22.36 **Stranded Asset Potential**: The DMRE fails to consider the risk of stranded assets as the world moves towards decarbonization. Ignoring the potential for gas infrastructure to become obsolete or economically inviable before yielding returns ignores the financial and environmental consequences.

2.22.37 **Alternative Solutions Overlooked**: The DMRE disregards the feasibility of alternative technologies that could replace gas for power generation. Independent studies highlight the viability of renewable energy and storage solutions to meet power needs without the negative environmental impacts of gas.

2.22.38 **Failure to Rethink Security of Supply:** The assessment centers on gas technology for electricity supply security, rather than assessing whether South Africa truly needs to rely on gas

for such security. This approach neglects the potential of alternative technologies such as wind, solar and battery storage, that pose fewer environmental and health risks.

2.22.39 **Climate Crisis Overshadowed:** The DMRE does not give adequate weight to the urgency of addressing the climate crisis. Failing to prioritize the rapid phase-out of fossil fuels, as demonstrated by scientific studies, undermines efforts to achieve climate goals and jeopardizes South Africa's sustainable development ambitions.

2.22.40 In assessing need and desirability, NEMA requires that development be sustainable and requires the competent authority to *"take into account all relevant factors."* The Guideline requires need and desirability assessment to address the impact of planned activities on global and international responsibilities relating to the environment, including climate change.

2.22.41 The FEIAr includes some climate policy in its analyses but does not provide a critical analysis of need and desirability from a climate change perspective.

2.22.42 The need and desirability (from a climate change perspective) of conducting exploration drilling (which aims to identify oil and gas resources to be used in energy production and/or processing or manufacturing of materials) is particularly important given that climate change has been acknowledged as a 'crisis' with human-induced climate change impacts being experienced in every region. It is also recognised that the climate change 'crisis' requires immediate, rapid and large-scale reductions in greenhouse gas (GHG emissions to limit global warming to 1.5°C (including accelerated action in this decade to reduce global carbon dioxide emissions by 45 per cent by 2030 relative to the 2010 level and to net-zero around mid-century).

2.22.43 In August 2021, the Intergovernmental Panel on Climate Change (IPCC) (an international body for assessing the science related to climate change) released its 6th Assessment Report (AR6). In its summary for policymakers, the IPCC indicates (among other things) that:

- It is unequivocal that human influence has warmed the atmosphere, ocean and land, and that widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred;

- The scale of recent changes across the climate system as a whole – and the present state of many aspects of the climate system – are unprecedented over many centuries to many thousands of years;
- Human-induced climate change is already affecting many weather and climate extremes in every region across the globe. Evidence of observed changes in extremes such as heatwaves, heavy precipitation, droughts, and tropical cyclones, and, in particular, their attribution to human influence, has strengthened since AR5;
- Global surface temperature will continue to increase until at least mid-century under all emissions scenarios considered, and that global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO_2 and other GHG emissions occur in the coming decades;
- Many changes in the climate system become larger in direct relation to increasing global warming. They include increases in the frequency and intensity of hot extremes, marine heatwaves, heavy precipitation, and, in some regions, agricultural and ecological droughts; an increase in the proportion of intense tropical cyclones; and reductions in Arctic Sea ice, snow cover and permafrost;
- Continued global warming is projected to further intensify the global water cycle, including it variability, global monsoon precipitation and the severity of wet and dry events;
- Many changes due to past and future GHG emissions are irreversible for centuries to millennia, especially changes in the ocean, ice sheets and global sea level;
- From a physical science perspective, limiting human-induced global warming to a specific level requires limiting cumulative CO_2 emissions, reaching at least net zero CO_2 emissions, along with strong reductions in other GHG emissions. Strong, rapid and sustained reductions in CH_4 emissions would also limit the warming effect resulting from declining aerosol pollution and would improve air quality.On 9 August 2021, the IPCC issued a press release relating to its AR6 report. It states that the report provides new estimates of the chances of crossing the global warming level of 1.5°C in the next decades, and finds that unless there are immediate, rapid and large-scale reductions in GHG emissions, limiting warming to close to 1.5°C or even 2°C will be beyond reach.

2.22.44 Also on 9 August 2021, UN Secretary-General António Guterres described the AR6 report as nothing less than "*a code red for humanity. The alarm bells are deafening, and the evidence is irrefutable*".

2.22.45 The climate 'crisis' is also recognised by the International Energy Agency (IEA), of which South Africa is an associated country. During or about July 2021, the IEA published its *Net Zero by 2050 – A Roadmap for the Global Energy Sector* report. In the foreword to this report, the Executive Director of the IEA states (among other things) as follows:

"We are approaching a decisive moment for international efforts to tackle the climate crisis – a great challenge of our times. The number of countries that have pledged to reach net-zero emissions by mid-century or soon after continues to grow, but so do global greenhouse gas emissions. This gap between rhetoric and action needs to close if we are to have a fighting chance of reaching net zero by 2050 and limiting the rise in global temperatures to 1.5 °C

Doing so requires nothing short of a total transformation of the energy systems that underpin our economies…

Despite the current gap between rhetoric and reality on emissions, our Roadmap shows that there are still pathways to reach net zero by 2050. The one on which we focus is – in our analysis – the most technically feasible, cost-effective and socially acceptable. Even so, that pathway remains narrow and extremely challenging, requiring all stakeholders – governments, businesses, investors and citizens – to take action this year and every year after so that the goal does not slip out of reach.

2.22.46 This report sets out clear milestones – more than 400 in total, spanning all sectors and technologies – for what needs to happen, and when, to transform the global economy from one dominated by fossil fuels into one powered predominantly by renewable energy like solar and wind. Our pathway requires vast amounts of investment, innovation, skilful policy design and implementation, technology deployment, infrastructure building, international co-operation and efforts across many other areas.

2.22.47 Since the IEA's founding in 1974, one of its core missions has been to promote secure and affordable energy supplies to foster economic growth. This has remained a key concern of our

Roadmap, drawing on special analysis carried out with the International Monetary Fund and the International Institute for Applied Systems Analysis. It shows that the enormous challenge of transforming our energy systems is also a huge opportunity for our economies, with the potential to create millions of new jobs and boost economic growth.

2.22.48 Another guiding principle of the Roadmap is that clean energy transitions must be fair and inclusive, leaving nobody behind. We have to ensure that developing economies receive the financing and technological know-how they need to continue building their energy systems to meet the needs of their expanding populations and economies in a sustainable way. It is a moral imperative to bring electricity to the hundreds of millions of people who currently re deprived of access to it, the majority in of them in Africa..."

2.22.49 On fossil fuels used in energy production, the report states that: "***There is no need for investment in new fossil fuel supply in our net zero pathway***. *Beyond projects already committed as of 2021, there are no new oil and gas fields approved for development in our pathway, and no new coal mines or mine extensions are required".*

2.22.50 When natural gas is burned for energy, it releases carbon dioxide into the atmosphere. More importantly, the extraction, processing, transport and use of natural gas cause significant amounts of methane to be released into the atmosphere too. *According to the United Nations,* ***methane is 84-86 times more potent greenhouse gas than carbon dioxide over a 20-year period, and 28-34 times more potent over 100-year period.*** More research is also showing that methane often leaks during the production, transport and use of natural gas. Therefore, its contribution to climate change is significantly unaccounted for. Drones, laser absorption spectroscopy, and satellites, among other new methane monitoring technologies, have improved the identification and quantification of emissions across the gas lifecycle, leading researchers to conclude that national governments have almost universally underestimated these emissions.

2.22.51 If 3,000 megawatts of new gas-to-power plants were built to meet South Africa's 2019 Integrated Resource Plan for Electricity, and the plants were fueled by imported LNG, the annual emissions from this fuel use would be more than 2.5 million tons of CO2e (carbon dioxide equivalent) if the plants ran at 75% capacity. This is the equivalent of driving over half

a million gasoline-powered vehicles for a year. For gas or any other fossil fuel, a life-cycle analysis is therefore necessary to quantify the total amounts of GHG emissions (predominantly carbon dioxide and methane) that result from every step in the energy production process: from extracting the fossil fuel at the well or mine to burning it at a power plant or other facility. This is therefore important because all these processes are linked and should not be viewed in isolation.

2.22.52 As appears from the expert affidavit of Professor Mark New, in the *Sustaining the Wild Coast* case, most of the discovered reserves of oil and gas cannot be burnt if we are to stay on the pathway to keep global average temperature increase below 1.5 degrees Celsius. Therefore, authorising new oil and gas activities in any form, with its goal of finding commercially exploitable reserves and consequently leading to production, is not consistent with South Africa complying with its climate change commitments, and is certainly not needed or desirable from a global or domestic perspective.

2.22.53 South Africa has pledged to stay on a course that will keep global average temperature increases below 1.5 degrees Celsius, which, according to international experts, can only be accomplished by not exploiting any additional oil and gas reserves. According to the International Energy Agency's ("IEA") recent report, "Net Zero by 2050: A Roadmap for the Global Energy Sector ," for instance, achieving net zero by 2050 and limiting the rise in the average global temperature to 1.5 °C above pre-industrial levels "requires nothing short of a total transformation of the energy systems" that underpin the economies of the world and can only be achieved if there are no new oil and gas fields approved for development. This report calls for an immediate and massive deployment of all available clean and efficient energy technologies, as well as no approvals being granted for the development of new oil and gas fields.

2.22.54 The additional GHG emissions that will originate from new oil and gas fields in South Africa (inland and offshore), will push the world closer to the tipping point of breaching the limit of 1.5 °C targeted at the 2021 COP26 UN climate summit, and should thus be avoided at all costs. Instead, South Africa should harness its impressive scientific and technical capacity to develop and harness sustainable, renewable energy sources, in line with the country's vast potential.

2.22.55 In order to combat climate change and keep global warming at or below 1.5 °C, gas-fired power production is neither a strategic nor an effective strategy, according to development goals for the electricity sector. In the next 10 years, significant ambition is needed to sufficiently reduce emissions within the necessary trajectory range and to get South Africa where it needs to be. Doing this requires a commitment to abandon fossil fuels as soon as possible – and certainly to avoid lock-in to new fossil fuel infrastructure which is not needed, which the Gas Master Plan and Upstream Petroleum Development Bill seek to accelerate. In addition, according to the Paris Agreement's accounting rules, gas exporters like the United States and likely South Africa, must count all emissions from upstream extraction, processing, domestic transport, and liquefaction at the LNG export terminal in their national emissions inventory (NEI). For importing countries, only emissions from regasification, local transport, and combustion are counted in their NEIs.

2.22.56 Inaccurate Accounting of Emissions for Importing and Exporting Countries: The assessment of the need and desirability assessment of the FEIAr by the DMRE does not properly account for the emissions associated with gas export and import, undermining the accuracy of emissions reporting and international efforts to combat climate change:

- Incompatibility with Net Zero Pathways: The assessment by the DMRE does not align with global efforts to achieve net-zero emissions by 2050. The IEA's roadmap clearly states that no new oil and gas fields should be developed beyond existing commitments to effectively address climate change.
- Failure to Consider Climate Risks and Carbon Border Taxes: The assessment by the DMRE overlooks potential risks associated with investing in gas infrastructure, including volatile international gas prices and the possibility of carbon border taxes, which could render gas-based economic development financially and environmentally unsustainable.
- Disregard for Urgent Climate Action: The assessment overlooks the urgency of the global climate crisis, as highlighted by authoritative bodies such as the IPCC and the IEA. These entities emphasize the necessity of rapid and significant reductions in greenhouse gas emissions, rendering continued investment in fossil fuels incompatible with achieving climate goals.

2.22.57 Furthermore, LNG is an especially problematic form of natural gas for the climate. Chilling gas to incredibly cold temperatures uses a lot of energy. Holding it at that temperature uses energy.

Transporting it by ship, rail, and truck uses energy. Warming it back up uses a lot of energy. When you add all of that up, LNG is responsible for about twice as much greenhouse gas as ordinary natural gas. Fourteen percent of the climate footprint of LNG comes from gas leaks, flaring, or intentional venting (for example, when operators release gas into the atmosphere to allow for maintenance on a pipe) during production and transport. To produce the same amount of energy, LNG emits 14 times as much carbon as solar power, and 50 times as much carbon as wind power.

2.22.58 Average life-cycle GHG emissions for exported LNG, as reported in the studies, range from 719 to 900 grams of carbon dioxide equivalent emitted per kilowatt hour (g CO2 e/kWh) in the short-term time frame and 629 to 688 g CO2 e/kWh in the long-term time frame. The short-term climate impacts, particularly for the upstream and regasification life stages, are higher because these stages emit mostly methane, which is a much more potent GHG in the near term (about 80 times more potent than CO2 over 20 years, but only about 30 times more potent over 100 years). Thus, emissions during the upstream stage make up 29 to 52 percent of the total emissions in the short term, but only 16 to 34 percent in the long term.

2.22.59 In addition to the above, emissions attributable to overseas export of gas (the liquefaction, tanker transport and regasification life stages) make up the final 8 to 21 percent for the 20year time frame and 10 to 21 percent for the 100-year time frame. These emissions represent a significant addition to the climate warming consequences of using gas.

2.22.60 Most life-cycle assessments for gas and exported LNG, as well as many arguments in favor of expanding the industry, assume that this fuel will be used to replace dirtier and more carbon-intensive fuels like coal. But there is no guarantee that this will happen.

2.22.61 About half of the total emissions from LNG occur before any electricity is generated, mostly from methane leaks during the upstream life stage and the liquefaction and regasification stages required for overseas export. For example, studies from the National Energy Technology Laboratory (NETL) and Carnegie Mellon found that using different analytical assumptions for methane leakage rates and power plant efficiency resulted in total GHG emissions from exported LNG that were comparable to or even higher than those from coal in the short term.

2.22.62 Comparing the average emissions from LNG-sourced power plant operations with both 2030 scenario targets for electricity generation shows that, for the world and most regions, expanded use of imported LNG for gas-fired electricity production will make achieving these targets more difficult. Globally, generating all electricity by burning only gas— regardless of its source— nearly meets the Stated Policies Scenario 2030 target for worldwide electricity emissions, but it falls far short of the Sustainable Development Scenario target, with emissions that are more than 50 percent higher than the 2030 target.

2.22.63 The assessment by the DG overlooks the significant energy consumption associated with the LNG production process, including chilling, transportation, and regasification, which results in higher greenhouse gas emissions compared to ordinary natural gas. By focusing solely on the emissions from burning LNG, the DG assessment has ignored the substantial emissions that occur throughout its entire lifecycle, including leaks, flaring, and venting during production and transportation. Neglecting these crucial aspects distorts the comparison between LNG and coal, particularly in terms of their short-term emissions profile.

2.22.64 The assessment of the DMRE also fails to adequately address the short-term climate impacts of LNG, particularly in terms of methane emissions during the upstream and regasification stages. The potent short-term effects of methane are seemingly downplayed by the DMRE's assessment, even though LNG has a significantly higher global warming potential compared to carbon dioxide over a 20-year period.

2.22.65 Furthermore, the DMRE's assessment neglects to sufficiently account for emissions associated with the overseas export of LNG, which contribute a substantial portion to the overall carbon footprint. This oversight underestimates the true climate warming consequences of using LNG, especially when considering its transportation and regasification stages.

2.22.66 In summary, the DMRE's assessment of investing in LNG in the context of the climate crisis in South Africa demonstrates several significant oversights and failures. These include a lack of consideration for the full lifecycle emissions, downplaying the short-term impacts of methane emissions, underestimating the contribution of overseas export emissions, relying on unverified assumptions about fuel replacement, ignoring pre-electricity generation emissions, and

inadequately addressing the alignment of LNG-based electricity generation with emission reduction targets.

2.22.67 Building production, liquefaction, and shipping facilities to export more LNG would commit the country to decades of additional fossil fuel production further posing risks to stranded assets. This does not make sense at a time when we should be tapping into the potential of energy efficiency and investing in clean energy. Renewables and other technologies, like energy storage, are becoming cheaper and more reliable, and will always be more climate-friendly than LNG. For example, life cycle GHG emissions for solar power are less than 7 percent of average LNG emissions; life-cycle GHG emissions for wind power are even lower, less than 2 percent of average LNG emissions. The International Energy Agency through its projections found that widespread efforts to expand gas development would increase atmospheric GHG concentrations to 650 parts per million and global temperatures by 3.5 °C, well above the temperature predicted to result in catastrophic climate impacts.

2.22.68 The assessment by the FEIAr and subsequently the DMRE, fails to effectively compare the life-cycle greenhouse gas emissions of LNG with renewable energy sources. Neglecting to provide a comprehensive comparison obscures the stark difference in emissions, where solar and wind power have a fraction of the emissions associated with LNG.

2.22.69 Therefore, the conclusion made by DMRE in the context of the need and desirability which presupposes the need for the authorising exploration drilling for the purposes of determining the extent of available gas reserves for production, contravenes South Africa's international and national climate change commitments.

2.22.70 The Need and Desirability Guideline requires that:

"the consideration of 'need and desirability' during an application process… must consist of a primary description of the relevant considerations… in relation to feasible and reasonable alternatives. During the actual assessment stages of an EIA process the need and desirability must be specifically assessed and evaluated, including specialist input/studies as required."

2.22.71 Reasonable and feasible alternatives include the option of not implementing the activity.

2.22.72 A proper assessment of the No-Go alternative should have identified and assessed the potential ecological and socio-economic benefits of the no-go option for commercial and small-scale farming and livestock dependent communities, as well as urban and rural dwellers/occupiers of land making up the area of interest. The assessment should also necessarily have included a consideration of alternative means to generate energy and provide sustainable feedstocks for associated industrial applications, including renewable energy alternatives that do not pose a significant inter-generational ecological and socio-economic risk. Despite ample credible data and information supporting the cost effectiveness and sustainability of renewable energy in tackling climate change and energy insecurity, the FEIAr hastily dismisses these options. The FEIAr insists that the only definitive method of seeking hydrocarbon reserves is through exploration drilling, without providing any evidence to support this conclusion. This undermines the essential objective of identifying feasible and reasonable alternatives, rendering the assessment of such alternatives unnecessary.

2.22.73 Consequently, the option of not implementing the activity has not been evaluated by the DMRE at all in terms required guideline of need and desirability and the 2014 EIA Regulations as required in terms of assessing alternatives.

2.22.74 The legislative framework itself indicates that a production right flows directly from an exploration right, meaning that the two processes are inextricably linked. The MPRDA closely connects the rights of exploration with production by granting a holder of an exploration right the exclusive right to apply for, and be granted, the renewal of the exploration right or a production right, subject to few conditions. Impacts related to production activities are therefore reasonably foreseeable impacts eventuating from exploration. Despite the fact that exploration and production activities are listed separately for the purposes of the 2014 EIA Regulations, in reality they are steps in a single process. It is therefore artificial to exclude consideration of the impacts of the production process.

2.22.75 It is critical that FEIAr considered the cumulative impacts across a landscape and regional spatial extent in advance of activity beginning and throughout all project activities, including seismic surveys all the way through production. This is particularly important in light of the numerous applications for exploring and exploiting the Virginia field.

2.22.76 The FEIAr and consequently the DMRE in these EA applications, have seemingly adopted a fragmented and siloed approach to the consideration of this particular exploration and well drilling project individual impacts. An approach of this nature is very likely to consider the proliferation of projects which collectively have more harmful impacts spatially and regionally in their sum fundamentally changing the character of the region and its ecosystems.

2.22.77 Presently the current draft of the EIAs reports for both ER294 and ER318 do not adequately assess cumulative impacts across all impact types in the following ways:

- Rhino Oil has received permission to drill around 40 wells in two target areas, spanning over 1300 and 1235 properties respectively. However, these target areas are also home to thriving commercial agriculture, including various crops, livestock such as beef cattle and sheep, horticulture, dairy farming, game farming, aquaculture, and fruit production. These industries heavily rely on access to reliable water sources, air quality free from greenhouse gas emissions, and the preservation of non-degradable ecosystems. Unfortunately, the reports assessing the project have failed to quantify or evaluate the impact on water quantity and quality, air quality, and the overall ecosystem throughout the entire lifespan of exploration and production activities. Although the reports acknowledge to a limited extent the potential cumulative impacts of multiple drilling rigs operating in close proximity during exploration, they do not assess the significance of these cumulative effects within the context of production. This omission is concerning because it will significantly impact the capacity of agricultural practices in relation to downstream gas activities. Furthermore, the cumulative assessment lacks consideration for long-term regional monitoring, which would project and evaluate the impacts on water quantity and quality, socio-economic factors, air quality, and greenhouse gas emissions across different scales of.

- Rhino Oil holds not only two exploration blocks in the Northern Free State but also a third exploration area (ER 350) that encompasses parts of the Eastern Free State. Presumably, Rhino Oil intends to exploit the gas reserves identified and extracted in line with their exploration and production objectives. It is highly likely that these projects, once they reach the production phase, will overlap and collectively generate impacts across

the region, particularly concerning water quantity and quality, socioeconomic factors, air quality, and greenhouse gas emissions. However, despite the foreseeable consequences, the EIArs for both ER294 and ER 318 have failed to take into account the potential contribution of the third exploration project (ER 350) to the overall impacts experienced in the region.

- Several other gas and mineral industry projects are either currently operating or planned to operate in the vicinity of the aforementioned project areas. Among them includes the current proposed project, **Renergen,** a **renewable energy company**, holds the rights to extract and produce natural gas and helium in the Virginia area. Additionally, its natural gas subsidiary, the applicant, possesses a Production Right 12/4/007 for gas reserves production. Considering that the MPRDA links exploration rights with production rights, granting exploration right holders the exclusive opportunity to apply for and obtain the renewal of exploration rights or production rights with minimal conditions, the impacts arising from production activities by the applicant and Renergen are reasonably foreseeable. The planned Cluster 2 expansion would involve adding up to 300 new production wells and 400 exploratory wells. Cluster 2 would take the project from pilot-scale production of thirteen gas and helium wells to as many as 300 hundred wells producing up to 45 million cubic feet of natural gas per day across many thousands of hectares in the heart of South Africa's breadbasket. It was crucial, therefore, for the Final EIAr and consequently the DMRE to evaluate the cumulative impacts not only of Rhino Oil's industry projects but also of the applicant and Renergen's projects. This assessment should have specifically addressed the impacts on water quantity and quality, socio-economic aspects, air quality, and greenhouse gas emissions. A comprehensive cumulative assessment would have duly considered, evaluated, and proposed suitable mitigation measures to address the cumulative impacts resulting from all these contributors, taking into account the region's ecosystem and human health as key indicators.

2.22.78 The FEIAr and consequently the DMRE should have acknowledged the inseparable relationship between exploration and production within the scope of the cumulative impact assessment, and within all the other specialist expert reports. Unfortunately, there are significant gaps in the evaluation of cumulative impacts. The existence of significant gaps in the cumulative impact assessments affects the importance given to the analysis limited to

exploration and well drilling. In other words, the gaps in the assessments diminish the value and weight assigned to the examination of the impacts resulting from only exploring and drilling wells. These significant gaps were not adequately addressed in the Final EIAr report nor the DMRE's reasons for the decision and have consequently remained unaddressed. As a result, the evaluation of cumulative impacts by the Final EIAr and the consequently the DMRE fail to accurately evaluate and quantify the cumulative impacts that will become significant in the future if all the mentioned applications proceed and involve intrusive activities such as well drilling, testing, and production.

Failure of the DG to consider and evaluate the regional and municipal policies relevant to the need and desirability assessment

2.22.79 In the need and desirability assessment, it is important that policies take cognisance of strategic concerns such as climate change and food security, as well as the sustainability in supply of natural resources and the status of our ecosystem services.

2.22.80 Other relevant policies should have been included in the assessment of need and desirability, including the Free State Green Economy Strategy. According to the Free State Green Economy Strategy, one of its stated goals is to provide for the facilitation of increased investments in renewable energy. The Free State Green Economy Strategy focuses on reducing health and environmental impacts from energy production and use, while ensuring the basis for long-term economic growth. Such an integrated strategy can increase provincial and national energy security and reduce carbon emissions while providing new employment opportunities that may more than compensate for jobs that disappear due to the reduced use of other sources of energy (e.g. fossil fuels).

2.22.81 The Free State Green Economy Strategy recognizes that renewable off-grid and mini-grid options tend to be more cost effective than expanding existing electricity grids in remote locations. The strategy also recognizes that the Free State province is rich in these renewable energy sources, such as small hydro, mini-wind, bioenergy, and the increasingly popular solar household systems (SHSs). Furthermore, the strategy acknowledges that the Free State Province has a huge potential to alleviate rural energy poverty and to displace costly diesel-based power generation through the development of renewable energy infrastructure.

2.22.82 The strategy also prioritises the support of its agriculture, tourism, and built infrastructure sectors, as well as the growth of the renewable energy sector, all to the benefit of the local communities and the economy. This all hinges on a climate resilient Free State province, which will be threatened by climate change impacts and biodiversity impacts brought on by this potential development. These impacts could destabilise environmental and socio-economic sustainability as established by the latest IPCC reports.

2.22.83 Given the above, it is improbable that the proposed gas exploration, and possible production which will lead to upstream gas infrastructure, is indeed needed and desirable. The potential threats a catastrophic gas leak, water and soil contamination, or decreased climate resilience poses to the Municipality's desired net zero carbon economy outweigh the potential benefits of this activity.

2.22.84 What is needed and desired for a specific area is best determined strategically and democratically. The strategic context informing the elements of need and desirability should first be addressed and determined during the formulation of the sustainable development vision, goals and objectives of the various provincial and municipal plans and policies. These greater considerations should be determined beyond the spatial extent of a specific and individual EIA process, and then considered in the context of an individual EIA.

2.22.85 It is in this context that it is submitted that the DMRE ought to have considered the Free State Green Economy Strategy, Free State 2030 Vision, in order to give effect to the underlying principles which are the consideration of the strategic context of the development proposal along with the broader societal needs and the public interest.

2.22.86 Furthermore, the Free State provincial authorities, through their district and municipal spatial development frameworks and Green Economy strategies, indicate their commitment to ensuring that there is a consideration and identification of climate change related impacts on the water-food-energy nexus.

2.22.87 The current FEIAr has not identified nor addressed the types of impacts that would befall local communities in all aspects of the water-energy-food nexus system as it relates to food

production, processing, availability, distribution, accessibility, utilization and consumption and stability through agriculture, water resource preservation and energy generation.

2.22.88 In order to determine whether the development will result in securing ecological sustainable development and the promotion of justifiable social and economic development, the specific needs of the broader community must be considered alongside the opportunity costs and distributional consequences.

2.22.89 The FEIAr and consequently the DG should have considered the above long-term goal of the Free State Green Economy Strategy and the Free State 2030 Vision, as it is relevant to the current context and is necessary to factor into the need and desirability assessment.

2.23 The second appellant submits that:

2.23.1 There is a lack of assessment of the adverse economic consequences.

2.23.2 Natural gas is put forward by the applicant as an economically viable option. While the applicant acknowledges that *"in the long term, it is very possible that even natural gas usage becomes an undesirable commodity, as is the case with coal at present"*, it should be noted that the applicant does not provide quantification of the phrase 'long term', neither does it conduct an analysis of the potential adverse economic impacts that may occur should South Africa lock into gas infrastructure.

2.23.3 The reality is that locking into new gas infrastructure while we are in a climate emergency that demands a phasing out of fossil fuel-related infrastructure is economically irrational.

Is gas necessary

2.23.4 The International Institute for Sustainable Development ("IISD") assessed whether natural gas is necessary or desirable in South Africa. Their report, Gas Pressure: Exploring the case for Gas-fired power in South Africa26, acknowledges the energy crisis that currently plagues South Africa, the pressing need for low- carbon utility scale electricity and associated infrastructure and the fact that South Africa is on the verge of a rush for gas.

2.23.5 Despite the reality of the energy crisis, the IISD deems the rush for gas to be misguided and an expensive mistake.

The shifting landscape

2.23.6 There is increased pressure internationally to limit or completely phase out gas.

2.23.7 At an institutional level, the International Energy Agency has advised that to ensure a limitation of global warming to 1.5 C, the threshold at which climate change will be irreversible, "there can be no new investments in oil and gas fields approved for development29" on the necessary pathway to net-zero Furthermore, at the international multilateral level, over 100 countries have signed the Global Methane Pledge which aims to reduce their methane emissions by 30% (compared to 2020 levels) by 2030.

2.23.8 The IISD argues that there is a very high likelihood of gas becoming a stranded asset in South Africa due to the abovementioned factors.

2.23.9 The National Development Plan 2030 (NDP) recognized this risk when it articulated the "least regret" principle guiding "the transition to an environmentally sustainable low-carbon economy, moving from policy, to process, to action". The Least regret principle in the NDP is articulated thus: Invest early in low-carbon technologies that are least-cost, to reduce emissions and position South Africa to compete in a carbon-constrained world.

2.23.10 The applicant did not provide an analysis of these economic risks, instead only focused on positive economic impacts of the proposed project38. Without an assessment of the potential negative economic impacts, important, relevant information was not before the DMRE when it made the Decision. The DMRE's decision was unlawful in terms of section 6(2)(e)(iii) of PAJA in that relevant considerations were not considered.

Failure to consider alternatives

2.23.11 The climate impacts of gas as well as the potential stranding of gas assets, the comprehensive consideration of feasible and reasonable alternatives to proposed gas projects is of paramount importance. Such comprehensive consideration must include a description and comparative assessment of the advantages and disadvantages that the proposed project and the considered alternatives will have.

2.23.12 Page 123 of the FEIAr Tetra4 acknowledges the legal imperative of assessing alternatives, stating that "The assessment of the identified alternatives is a key aspect of the success of the EIA process. All reasonable and feasible alternatives must be identified and screened to determine the most suitable alternatives to prevent unnecessary impacts on the receiving environment."

2.23.13 The applicant seems to promote natural gas as a bridging fuel, acknowledging that "*in the long term, it is very possible that even natural gas usage becomes an undesirable commodity, as is the case with coal at present*". However, South Africa currently does not have the infrastructure that would be necessary for the full life cycle of upstream, midstream, and downstream gas activities. With the climate impacts of gas, and the likelihood of asset stranding, the combination of which poses enormous risk to directly affected communities in the first instance and the state in the second instance, it is irrational to promote (and to approve licenses for) gas as a bridging fuel. Additionally, doing so will divert investment away from renewable energy which does not have the climate impacts nor the risk of asset stranding.

2.23.14 Renewable energy can be established in a faster time period and is significantly cheaper than gas-fired energy for the consumer. Renewable energy as an alternative should have been assessed from a need and desirability perspective.

Renewable energy

2.23.15 It is well documented that the cost of electricity generated by renewables such as wind and solar is cheaper than the cost of electricity generated from fossil fuel.

2.23.16 The price advantage that renewable energy has over gas is evidenced by improvements in battery technology, which has also seen a price decline internationally and locally. In South

Africa, there is a similar trend: 3-hour battery storage is significantly cheaper than gas for peaking purposes, with the Council for Scientific and Industrial Research advising that the modelling requirement for gas turbines in South Africa's energy mix could very well be supplanted by renewable battery storage should the price reduction of renewable energy continue.

2.23.17 Sticking to fossil fuel by committing to new gas infrastructure is not economically feasible, but rather, economic self- harm. As renewable energy provides a fast new alternative to natural gas as a renewable and environmentally friendly energy system with less technical complexity, it is submitted that the applicant should have considered and provided an assessment of this as a fuel alternative. The applicant, however, failed to do so.

2.23.18 The legislative requirement that there be a comprehensive consideration of a project's potential impacts as well as an assessment of feasible alternatives to a proposed development was not complied with. The applicant's failure to adequately assess the climate change impacts and to consider alternatives means that DMRE did not consider all relevant information before it in making its decision. This renders the decision non-compliant with section 6 (2)(e)(iii) of PAJA.

No-go alternative

2.23.19 In addition to the direct implications of retaining the status quo there are certain other indirect impacts, which may occur should the No Go alternative be followed. The No Go alternative as a specific alternative is not considered feasible and has been scoped out at this EIA phase assessment. "No clear reference is made as to what these "other indirect impacts" are. The applicant does not provide a comprehensive consideration of what the negative or positive environmental, and other, impacts of the no-go alternative are. Furthermore, the FEIAr assumes that the majority of the gas will be shipped to China and the overseas market. There is no mention of how this will be practicable without as South Africa lacks the requisite infrastructure to do so.

Applicant's Response

2.24 In response to the first appellant, the applicant submits that:

2.24.1 This specific ground of appeal does not appear to be directed at the Tetra4 Cluster 2 Virginial Gas Production Project. This appears to be an error by the first appellant in including an appeal against an exploration application which is unrelated to the Tetra4 project. This ground of appeal generally focuses heavily on an "exploration" application with the contention that the "full lifecycle" of gas exploration and production should have been assessed. The applicant's EA application relates to Production Activities and therefore has considered the full lifecycle.

2.24.2 Both appellants' attention is drawn to the following: the DMRE's decision to grant the EA is consistent with the Constitution of the Republic of South Africa, 1996 ("*the 1996 Constitution*"). Section 2 of the 1996 Constitution provides that the 1996 Constitution is the supreme law of the Republic of South Africa; that any law or conduct inconsistent with it is invalid; and that the obligations imposed by it must be fulfilled.

2.24.3 In addition, section 7(2) of the 1996 Constitution provides that the State (and thus also any Organ of State, such as the Responsible Authority) must respect, protect, promote, and fulfil the rights in the Bill of Rights. Consequently, the Responsible Authority was under a constitutional duty to take a decision not only consistent with, but also respecting and/or protecting and/or promoting and/or fulfilling the fundamental right to the environment as contemplated in section 24 of the 1996 Constitution, which provides as follows:

Everyone has the right—
(a) to an environment that is not harmful to their health or well-being; and
(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that—
(i) prevent pollution and ecological degradation;
(ii) promote conservation; and
(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

2.24.4 Section 24(b)(iii) of the 1996 Constitution contains what is generally known as the constitutional imperative for sustainable development. The DMRE took the constitutional imperative for sustainable development into account, and consequentially, the granting of the EA, was consistent with the constitutional obligations of the DMRE.

2.24.5 All of the available specialist reports, including the assessment of the need and desirability of the project, the applicable alternatives consideration and specialist recommendations, points thereto that the granting of the EA will comply with the constitutional imperative for sustainable development: not only will there be an ecological sustainable use of natural resources, but such continued use will also promote justifiable economic and social development.

2.24.6 The MPRDA is, by virtue of sections 5A(a) and 38A directly linked to the NEMA, and, as such, the national environmental management principles contained in section 2 of the NEMA:

- apply alongside all other appropriate and relevant considerations, including the State's responsibility to respect, protect, promote, and fulfil the social and economic rights in chapter 2 of the 1996 Constitution and in particular the basic needs of categories of persons disadvantaged by unfair discrimination (which this project continuously address;
- serve as guidelines by reference to which any Organ of State (including the DMRE) must exercise any function when taking any decision in terms of any statutory provision concerning the protection of the environment;
- guide the interpretation, administration and implementation of any other law concerned with the protection or management of the environment.

2.24.7 The EA application relates to "production activities" and therefore has considered the full lifecycle in the need and desirability analysis. The need and desirability assessment was undertaken according to the Guideline on need and desirability in terms of the 2014 EIA Regulations.

2.24.8 The first appellant incorrectly refers to Rhino Oil and associated exploration activities. The authorised activity which relates to this appeal is for Tetra4 production and is unrelated to the Rhino Oil Exploration.

2.24.9 The first appellant incorrectly refers to seismic surveys. This EA under appeal does not include any seismic activities.

2.24.10 The EIA includes a detailed description of the project Needs and Desirability which has been developed in accordance with the Guideline on need and desirability in terms of the 2014 EIA Regulations.

2.24.11 It is uncertain as to what the appellant means by "significant time lag". The Tetra4 Cluster 1 / Phase 1 is already in operation (since 2022) and is expected to start producing LNG from the Cluster 2 activities within 3 years of construction (~2026). This is not a significant time gap and would avail the gas resource as a replacement energy source within the required transition period.

2.24.12 Besides the drilling phase, upstream emissions of the Cluster 2 project including transport and power generation was included in the CCIA. The first appellant's comment focusses on an exploration project however their EA application is for "production activities".

2.24.13 The first appellant's comments relate to exploration and lack of full life-cycle assessment (i.e. production related impacts). These comments do not appear to be tailored to the Tetra4 Virginia Gas Production project which is for production activities. The description and scope of the activities applied for are included in section 4 of the FEIAr and the full life-cycle assessment of these activities are included in Section 10 of the FEIAr.

2.24.14 As LNG will be replacing other fuels already in use, there will be a reduction in indirect GHG emissions resulting in an indirect GHG emissions reduction of 85 960 tpa. (see CCA report Table 10). As pointed out by the first appellant, natural gas is certainly a cleaner energy source than coal, and therefore relative to coal, must be considered as more desirable in this context.

2.24.15 Further to the first appellant's argument for carbon border adjustment mechanisms, South Africa is an exporter of coal which is considered a more carbon intense fuel source when compared to LNG. Therefore, the resultant carbon cross border taxes should be less for LNG than for coal. Therefore, one could assume that the use of LNG as a transition from coal would have a better border tax implication.

2.24.16 The first appellant does not provide the suggested references to the two independent studies and therefore their statement is noted.

2.24.17 The first appellant provides various extracts from reports and studies to justify the latter comments however the latter comments relate to an exploration/reconnaissance project and therefore are not deemed relevant to this project.

2.24.18 The Presidential Climate Commission (PCC) is recommending that the next edition of the Integrated Resource Plan (IRP), which is currently under review, caters for gas peaking support to the renewable energy mix. It is understood that the PCC recommendations included a review of the Meridian Report.

2.24.19 The first appellant makes reference to exploration activities and the timeframe for typical gas projects to reach production however the applicant's EA Application is for production activities as the gas reserves have already been confirmed through the Cluster 1 / Phase 1 production project.

2.24.20 The applicant's EA application is for production activities and not exploration activities as stated by the first appellant.

2.24.21 The first appellant focuses heavily on the methane component of this project however the methane can be considered a by-product of the Helium production. Helium is a key driver of the need and desirability of this project as the Virginia gas field has been proven to contain one of the highest Helium concentrations globally.

2.24.22 Table 8 of the CCIA provides that quantified GHG emissions accounted for the methane content.

2.24.23 All relevant scope 3 GHG emissions were quantified based on the information available at the time of the study. Transportation of the LNG was in fact considered under scope 1 emissions, and not scope 3 indirect emissions, as the transport of LNG will be undertaken by the applicant themselves and was therefore assumed to be a direct emission.

2.24.24 LNG can be considered a by-product of the Helium production. Helium is a key driver of the need and desirability of this project as the Virginia gas field has been proven to contain one of

the highest Helium concentrations globally. Even if the market for LNG subsides, there will still be a market for Helium, and therefore the likelihood of this project becoming a stranded asset is low.

2.24.25 A CCIA was conducted accounting for scope 1, 2 and 3 GHG emissions from both the Construction and Operational Phases of the project.

2.24.26 A comprehensive CCIA was included in Appendix 4 of the FEIAr and discussed within the FEIAR in various sections. The climate change baseline and physical risks associated with climate change in the region are discussed in Section 3 of the CCA. Two trajectories are included in the CCA based on the four Representative Concentration Pathways (RCPs) discussed in the IPCC's fifth assessment report (AR5) (IPCC, 2013). RCPs are defined by their influence on atmospheric radiative forcing in the year 2100. RCP4.5 represents an addition to the radiation budget of 4.5 W/m^2 as a result of an increase in GHGs. The two RCPs selected were RCP4.5 representing the medium-to-low pathway and RCP8.5 representing the high pathway. Sections 10.2.1.2 and 10.2.2.2 of the FEIAr provides the impact of climate change.

2.24.27 The Methane component of CO2eq is accounted for in the GHG emission factors used in the CCA and management and mitigation measures include recommendations on leak prevention, detection, and repair.

2.24.28 No comparison is given by the first appellant to the amount of GHG emissions that would be generated by burning coal or other fuels for the same amount of MW. This would be comparable to even more vehicles. For example, for 3 000 MW, coal needed would be ~ 9000 tonne/day, equating to 7.4 million tonnes of CO2e, the equivalent of driving over 1.7 million gasoline-powered vehicles for a year.

2.24.29 All relevant GHG emissions were quantified based on the information available at the time of the study, both upstream and downstream of the plant.

2.24.30 There will be no import of gas associated with this project. It was assumed that 60% of the LNG produced (~ 90 000 tpa) would be shipped by sea tanker to China as a worst-case scenario since the end-users have not been established at the time of the study.

2.24.31 The CCIA included scope 1, 2 and 3 GHG emissions from the proposed project (refer to section 9.14 of the FEIAr and the CCA report included in Appendix 4). It was calculated that GHG emissions from this project would add less than 0.1% to the SA Total GHG Emissions as of 2020 (excl FOLU), and 0.12% to the SA Energy Sector total (2020). This is including gas production. Mitigation in the form of leak detection, monitoring and repair has been included.

2.24.32 It was assumed that 60% of the LNG produced (~ 90 000 tpa) would be shipped by sea tanker to China as a worst-case scenario since the end-users have not been established at the time of the study.

2.24.33 Approximately 67 – 74 % of the total life cycle emissions are from the power generation from LNG based on the PACE report (Oct 2015). It is assumed the comment should read *"CH4 has a higher GWP than CO2"*.

2.24.34 Overseas export was accounted for in the CCIA. It was assumed that 60% of the LNG produced (~ 90 000 tpa) would be shipped by sea tanker to China as a worst-case scenario since the end-users have not been established at the time of the study.

2.24.35 The full lifecycle GHG emissions (scope 1, 2 and 3) were quantified using the DFFE emission factors for Scope 1 (Government Gazette No. 47257, 7 October 2022), and the UK DEFRA emission factors for Scope 3. These emission factors account for methane. The assumption of how much LNG would be exported was based on information provided by the applicant.

2.24.36 The first appellant's comments are focussed on exploration activities and specifically mention "current draft of the EIAs reports for both ER294 and ER318" which are "exploration right" applications. The applicant's EA application relates specifically to "production activities" and therefore where relevant, responses are provided.

2.24.37 Project alternatives are discussed in section 7 of the FEIAr, and an assessment of the no-go alternative is provided.

2.24.38 Cumulative impacts were assessed in the FEIAr (refer to section 10). Seismic activities did not form part of this application.

2.24.39 With regard to the comment by the first appellant with specific reference to Rhino Oil, in the interest of clarifying the applicant's application position on this comment, the AQIA considered health and nuisance impacts as a result of construction and operational phase activities. Construction included for the roads/pipeline, wells and booster stations, vehicle, and equipment, three compressor stations and the plant might include land clearing, topsoil removal, material loading, bulk services construction, hauling, excavation, back-filling, road construction and traffic, rig-move/drilling, pipeline installation, and wind erosion of exposed areas. Operation phase included operation of the well pad, roads, pipelines, compression station, booster station and combined LNG/LHe plant, as well as associated emissions from movement of trucks and other vehicles, flaring (if applicable), and gas processing as well as operation of heavy machinery. The impacts resulted in a medium significance without mitigation, and low significance with mitigate.

2.24.40 The CCIA considered GHG emissions from scope1, 2 and 3 activities. Construction- and operational-related GHG emissions from the proposed Tetra4 Cluster 2 project cannot be attributed directly to any particular climate change effects, and, when considered in isolation, will have a Low to Medium impact on the National GHG inventory total. The main GHG impact is associated with downstream use of the LNG, i.e. scope 3.

2.24.41 The first appellant refers to exploration activities with specific reference to "Rhino Oil" in certain statement setting this ground of appeal. The applicant's EA application was for production activities. The Tetra4 project included a comprehensive air quality impact assessment and CCIA (see response under item 122.1). The first appellant has further made reference to the Renergen / Tetra4 Cluster 2 project which provides evidence that this ground of appeal was for a different appeal submission and is erroneously included in this submission.

2.25 In response to the second appellant's ground of appeal, the applicant submits that:

2.25.1 Within the Need and Desirability analysis contained in the FEIAr, the IDP is discussed under Table 13 point 2.1.1 as well as section 9.4. The SDF is discussed in section 5.11 of the FEIAr, and the EMF is considered in Table 13 point 1.1.

2.25.2 The reasonable alternatives and no-go option were presented in section 7 of the FEIAr which underwent meaningful assessment in section 10 of the Final EIAR.

2.25.3 The specialist Economic Impact Assessment Report was included in Appendix 4 of the FEIAr while the economic impacts were presented in various sections of the FEIAr. Both the positive and negative economic impacts formed part of the aforementioned assessment.

2.25.4 Contrary to the second appellant's claim, quantification of the phrase "long term" was indeed provided in the sentence directly after the sentence quoted by the second appellant (i.e. "long-term" = a "generation" – in other words 20-30 years). It is not within the scope of this application to "*conduct an analysis of the potential adverse economic impacts that may occur should South Africa lock into gas infrastructure*" as this would represent a strategic assessment by the government of South Africa and would require significant understanding of the potential infrastructure required nationally.

2.25.5 Furthermore, the project achieved Strategic Integrated Project (SIP) status under the Infrastructure Development Act 23 of 2014 on 6 December 2022 (SIP 20, sub-project "f" (Oil & Gas National Program)) which emphasizes the significance of the project for the country.

2.25.6 Gas policy is determined by the relevant authorities and institutions within the South African government sphere, and it is therefore not within the ambit of the EIA to undertake a critical review of the Integrated Resource Plan.

2.25.7 The Economic Impact Assessment identified negative impacts (risks) which covered the construction, operational and decommissioning/closure phases (refer to sections 10.2.1.5, 10.2.2.5, 10.2.3.4 and 10.3 of the FEIAr).

2.25.8 The project alternatives were discussed in section 7 of the FEIAr, and the need and desirability was presented in section 6 of the FEIAr. An assessment of the positive and negative impacts

of the alternatives was presented in section 10 of the FEIAr and mitigation measures for both positive and negative impacts are included in the EMPr.

2.25.9 A comprehensive EIA of the project as well as alternatives is included in section 10 of the FEIAr. The climate change impacts were assessed in terms of Scope 1, 2 and 3 (Section 9.14 of the FEIAr) with proposed mitigation measures provided in the EMPr (Appendix 5 of the FEIAr).

2.25.10 The South African energy policy is determined by government and currently there is policy that makes provision for gas projects. It is not within the ambit of this application to interrogate the current policy in South Africa.

2.25.11 The CCIA was included in Appendix 4 of the EIAr, and this assessment included scope 1, 2 and 3.

Evaluation

2.26 The nub of this ground of appeal relates to whether the assessment of the need and desirability of the proposed activity complies with the requirements of the regulatory framework, the Department's policies and guidelines. I have considered the numerous contentions that the appellants have made in support of this ground of appeal, as encapsulated above, as well as the applicant's submissions in response thereto. I have also considered the record of information. I find as follows:

2.26.1 In support of this ground of appeal, the first appellant states inter alia, that the applicant and/or the CA failed to consider (i) the negative impact of long-term oil and gas production and downstream activities; (ii) the climate implications and to apply precautionary principle; (iii) adequately weigh the long-term climate repercussions; and (iv) assess cumulative impacts of the proposed activities.

2.26.2 In terms of regulation 23(3) of the 2014 EIA Regulations, an EIAr must contain all information set out in Appendix 3 to these regulations or comply with a protocol or minimum information requirements relevant to the application as identified and gazetted by the Minister in a government notice; paragraph 3(1)(f) of Appendix 3 referred above provides that:

" An EIAr must contain the information that is necessary for the competent authority to consider and come to a decision on the application and must include a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report."

2.27 I have considered the motivation for the need and desirability for the proposed development as described at paragraph 6.3 of the FEIAr and I have considered the Guideline on Need and Desirability (Guideline 9) published in Government Notice No. 891 in Government Gazette No. 38108 of 20 October 2014 ("Needs and Desirability Guideline"). I find that that the motivation for the Need and Desirability for the proposed development in the FEIAr does comply with the 2014 EIA Regulations and the Needs and Desirability Guideline for the reasons stated below:

2.27.1 The Development footprint alternatives are identified in section 7 of the FEIAr. The EAP states that, current agricultural activities within the Cluster 1 study area are able to continue within the vicinity of the gas production activities, particularly because the proposed pipeline network is below ground at a depth that allows for continued agricultural practises including ploughing.

2.27.2 The surface infrastructure of the gas production network is extremely small compared to the overall application area (even on an individual property) however lessons learned from the final siting (location) of the surface infrastructure in Cluster 1 has resulted in a more refined approach for Cluster 2.

2.28 I also considered that the impact of the proposed activities on the environment is assessed in paragraph 10 of the FEIAr including the cumulative impacts. Following the impact assessment of the proposed activities the EAP identified suitable mitigation measures were also included therein. This complies with regulation 23, and Appendices 2 (c) and (g) of the 2014 EIA Regulations.

2.29 In this ground of appeal, the first appellant contends that considering climate change implications the precautionary principle must be applied. The precautionary principle is defined in section 2(4)(a)(vii) of NEMA to mean:

"sustainable development requires the consideration of all relevant factors including that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decision and actions."

2.30 I am thus mindful that the NEMA risk averse and cautionary principles requires that I consider the limitation on present knowledge about the consequences of the decision and actions on the receiving environment.

2.31 I have also noted that the applicant submitted a CCIA report compiled by a specialist in support of its EA application.

2.32 I reviewed the CCIA report and considered GHG emissions from scope 1, 2 and 3 activities. Construction- and operational-related GHG emissions from the proposed Tetra4 Cluster 2 project cannot be attributed directly to any particular climate change effects, and, when considered in isolation, will have a Low to Medium impact on the National GHG inventory total. The main GHG impact is associated with downstream use of the LNG, i.e. scope 3. I am therefore satisfied that the GHG emissions have been considered and evaluated by the DMRE in its decision-making process.

2.33 This ground of appeal is accordingly without merit and stands to be dismissed.

Sixth ground of appeal: The DMRE failed to provide adequate reasons for decision

2.34 The first appellant submits that:

2.34.1 The reasons for the DMRE's decision, as described in Appendix 1 of the EA, sets out that the following were 'key findings' that resulted in the decision to approve the project proponent's application for EA.

2.34.2 The decision concludes as follows: *"In view of the above and having taken into consideration environmental management principles as set out in section 2 of NEMA, this Department is satisfied that the proposed activity will not be in conflict with the objectives of Integrated Environmental Management set out in Chapter 5 of [NEMA] and will not result to any detrimental risks to the environment and public. The EA is accordingly granted."*

2.34.3 These reasons, and the conclusion arising from these reasons are generic and unsubstantiated. The reasons are almost verbatim the same reasons provided by the DMRE in other oil and gas related applications. The EA itself further fails to deal substantively with any of the main issues raised by the Appellants and other I&APs.

2.34.4 On the reasons provided, it is impossible to conclude that the DMRE took all relevant considerations into account, including the submissions made by the appellants and other I&APs.

2.34.5 Decision-making should promote equity and fairness in the distribution of environmental benefits and burdens. This principle recognizes the rights of all individuals, particularly disadvantaged and vulnerable groups, to a healthy environment and seeks to avoid disproportionately negative impacts on these groups.

2.34.6 To the contrary, it appears that the DMRE failed to consider all relevant information, for the reasons set out elsewhere in this appeal.

2.35 In response to this ground of appeal, the applicant avers that:

2.35.1 This ground of appeal is directed at the CA and specifically the reported reasons for the decision as contained in the EA and therefore the applicant is not in a position to provide a response to this ground of appeal.

EVALUATION

2.36 The issue for determination is whether the CA gave adequate reasons for its decision to grant the EA. I have considered the numerous contentions that the first appellant has made in support

of this ground of appeal, as encapsulated above, as well as the applicant's submissions in response thereto. I have also considered the record of information. I find as follows:

2.36.1 I have noted that the first appellant elected to quote paragraph 4 of the Reasons for the Decision (ROD), which is the conclusion by the CA. Contrary to the first appellant's contention, the key findings and/or reasons by the CA to grant the EA are encapsulated in paragraph 3 of the ROD.

2.36.2 I am aware that the criteria for considering applications for EA is prescribed in regulation 18 of the 2014 EIA Regulations, which states that:

When considering an application, the competent authority must have regard to sections 24 and 24(4) of the Act, the need for and desirability of the undertaking of the proposed activity, the requirements of these Regulations, any protocol or minimum information requirements relevant to the application as identified and gazetted by the Minister in a government notice or any relevant guideline published in terms of section 24J of the Act.

2.36.3 Paragraph 3 of the EA under *"Key Findings"* explicitly provided reasons for granting the EA to the applicant, *inter alia*:

2.36.3.1 *"All fundamental and procedural requirements prescribed in the applicable legislation is satisfied;*

2.36.3.2 *Most of the potential impacts associated with the planned operations will be of low significance before and after mitigation. Potential impacts on soil contamination and degradation, employment expectations and groundwater contamination will be of medium significance before mitigation and low significance after mitigation;*

2.36.3.3 *The identification and assessment of potential impacts of the activity, including cumulative impacts, was adequately undertaken, and the proposed mitigation and management measures are aligned with potential impacts;*

2.36.3.4 *The motivation for the need and desirability of the proposed bulk sampling operations is in line with the requirements of the EIA Regulations, 2014 and it addressed key issues in the Need and Desirability Guideline;*

2.36.3.5 *Project Alternatives: The site/location, activity, design/layout, technology, operational aspects, and no-go alternatives were considered during the EIA phase. The nature of the proposed operations limits consideration of some of the alternatives, however three (3) alternatives,*

namely location, layout and no-go alternatives were considered preferred alternatives. As far as the no-go alternative, restrictions on sensitive areas were suggested and this offers a balanced approach of ensuring that environment is protected while development continues;

2.36.3.6 *The Public Participation Process (PPP) conducted by the applicant complied with chapter 6 of the EIA Regulations, 2014."*

2.36.4 Contrary to the first appellant's contention that adequate reasons for the EA had not been provided, the information above demonstrates that the CA's detailed reasons are set out in the EA, to justify its decision to grant the EA.

2.36.5 For the above reasons, this ground of appeal is dismissed.

Seventh ground of appeal: South Africa does not have the resources to monitor and enforce compliance at gas operations

2.37 The second appellant submits that:

2.37.1 South Africa currently does not have the resources or capacity to monitor and enforce compliance at gas operations. The proposed project should not proceed because South Africa does not currently have the capacity to adequately ensure that gas operations are compliant with environmental laws and licence through monitoring and enforcement.

2.37.2 Neither the competent authority nor PASA have the resources or capacity to fulfil their obligations to give effect to section 24 of the Constitution and that accordingly, the decision to grant the EA was irrational and dangerous, given the egregious impacts of gas production on the environment. The EA should be set aside for this reason also.

2.38 In response to this ground of appeal, the applicant submits that:

2.38.1 The second appellant's statement is irrelevant to the extent that an appeal of an EA should not be confused with the intergovernmental institutional arrangements or the purported lack

thereof. This is an inappropriate forum to deal with this subject matter and should rather be referred to parliament.

2.38.2 As this ground of appeal deals with the relevant authorities' resources or capacity to monitor and enforce compliance, it is not within the scope of the applicant to respond to this ground of appeal.

EVALUATION

2.39 The issue for determination appears to be whether the CA has the resources or capacity to monitor and enforce compliance with the EA. It is unclear to me on what basis the second appellant avers that *"South Africa currently does not have the resources or capacity to monitor and enforce compliance at gas operations. The proposed project should not proceed because South Africa does not currently have the capacity to adequately ensure that gas operations are compliant with environmental laws and licence through monitoring and enforcement."*

2.40 This is a bald and unsubstantiated ground of appeal. The appellant does not provide any reasons for the averment, nor is the averment supported by any facts or statistics in support thereof. It is settled law that *"the burden of proof rests on who asserts."* The appellant has failed to meet this burden.

2.41 In light of the above, this ground of appeal is dismissed.

3. DECISION

3.1 In reaching my decision on the appeals, I have taken the following information into consideration:

3.1.1 The information contained in project file 12/4/07;

3.1.2 The EIAr received by the DMRE on 10 February 2023;

3.1.3 The EA decision dated 13 July 2023;

3.1.4 The appeal filed by the first appellant on 08 August 2023;

3.1.5 The appeal filed by the second appellant on 08 August 2023;

3.1.6 The responding statement by the applicant dated 14 September 2023; and

3.1.7 The comments by the PASA on the grounds appeal filed on 20 November 2023.

3.2 Having carefully considered the abovementioned information, I have decided to:

3.2.1 Dismiss the third, fourth, fifth, sixth and seventh grounds of appeal.

3.2.2 In as far as I have considered the new information provided by the appellants in relation to the first and second grounds of appeal, I deem it appropriate to remit the application for EA to the DMRE for reconsideration. I am of the view that the appropriate recourse, is to afford the applicant an opportunity, as I hereby do, to remedy the identified shortcomings of the EIAr. I accordingly remit the matter to the DMRE for reconsideration on the issues arising in relation to the first and second grounds of appeal, and in this regard, I direct that the EIAr must include the following:

3.2.2.1 The CCA should be expanded upon in order to include the following:

- Specifically address the issues raised by the Expert Critique relating to the GHG emissions calculations;

- Provide a more detailed analysis of the impacts of climate change on the various activities associated with the construction and operation of the project, and on the environment and affected communities; and

- Expand further on more recent information relating to LNG as a viable "bridging fuel" for reducing GHG emissions;

3.2.2.2 Consideration to climate change and the impacts on river hydrology be considered before the application is processed, specifically in areas prone to flooding, and flood damage and where site infrastructure will be developed.

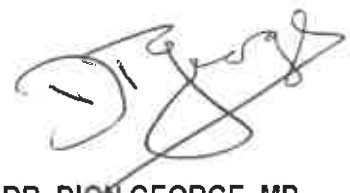
3.2.2.3 The potential hydrogeological impact (source terms) of the applicant's activities is not clearly defined (i.e. will the PCDs be lined, what will the water quality be, and where does the water come from). How source terms were applied in the numerical model is also not well understood. Details of the construction of the gas wells regarding possible leakage of deep groundwater into the shallow aquifer are not

addressed Details of the stratigraphy and hydrogeology of the gas wells are required, as well as the deep confined aquifer and the associated water quality. The presence of gas indicates that the deeper aquifers are confined and there are no details of piezometric pressures and water quality. This data must be available from the gas resource evaluation.

3.2.3 The revised EIAr and EMPr must be subjected to a PPP to allow registered I&APs an opportunity to review and comment thereon as required by the 2014 EIA Regulations. Comments received from I&APs, as well as responses thereto by the applicant, must be incorporated into the final EIAr for submission to the DMRE for reconsideration of the EA application. In this regard, the timeframes prescribed by the 2014 EIA Regulations, in respect of PPP and decision-making must be adhered to.

3.3 In arriving at my decision on the appeals, I have not responded to every statement set out in the appeals and/or responses thereto, and where a particular statement is not directly addressed, the absence of any response thereto should not be interpreted to mean that I agree with or abide by the statement made.

3.4 Should any party be dissatisfied with any aspect of my decision, they may apply to a competent court to have this decision judicially reviewed. Judicial review proceedings must be instituted within 180 days of notification hereof, in accordance with the provisions of section 7 of the Promotion of Administrative Justice Act, 2000 (Act No. 3 of 2000) (PAJA).



DR. DION GEORGE, MP

MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT

DATE: 1 August 2024