ENVIRONMENTAL ASSESSMENT (CLASS 2 UNDERTAKING)
Information Requests & Proponent Responses
Part 2

Goldboro LNG Project

Natural Gas Liquefaction Plant & Marine Terminal

Pieridae Energy (Canada) Ltd.

JANUARY 31, 2014

GOLDBORO LNG

ENVIRONMENTAL ASSESSMENT
(CLASS 2 UNDERTAKING)

INFORMATION REQUESTS AND PROPONENT RESPONSES
Part Two

GOLDBORO LNG PROJECT
NATURAL GAS LIQUEFACTION PLANT AND
MARINE TERMINAL

Submitted to:
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Environmental Assessment Administrator
Environmental Assessment Branch
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January 31st, 2014

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ACRONYM AND UNIT LISTS

GOLDBORO LNG

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LIST OF ACRONYMS

ACCDC	Atlantic Canada Conservation Data Centre
AGRS	Acid Gas Removal System
AMO	abandoned mine opening
API	American Petroleum Institute
ARDA	Antigonish Regional Development Authority
ARIA	Archaeological Resources Impact Assessment
ARTM	Atlantic Road and Traffic Management
BFL	Boreal Felt Lichen
BLEVE	Boiling Liquid Expanding Vapour Explosion
BOG	Boil-off Gas
BSC	Bird Studies Canada
C-1	Commercial General (District 7 Land Use Bylaw)
C3MR	Propane (C3) pre-cooled mixed refrigerant (MR) process
CAC	Criteria Air Contaminants
CB&I	Chicago Bridge & Iron UK Ltd
CBA	Collaborative Benefits Agreement
CBC	Canadian Broadcasting Corporation
CC-1	Coastal Community (District 7 Land Use Bylaw)
CCME	Canadian Council of Ministers of the Environment
CD	Chart Datum
CDN	Canadian
CEA	Cumulative Effects Assessment
CEAA	*Canadian Environmental Assessment Act*
CEO	Chief Executive Officer
CEPA	*Canadian Environmental Protection Act*
CH_4	methane
CHB	Community Health Boards
CHS	Canadian Hydrographic Services
CLC	Community Liaison Committee
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COO	Chief Operating Officer
COGAS	Combined Gas and Steam
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CRA	commercial, recreational, or Aboriginal
CSA	Canadian Standards Association
CWS	Canadian Wildlife Service
DFO	Fisheries and Oceans Canada
DHV	Design Hourly Volume
DWA	Deer Wintering Area's
EA	Environmental Assessment

EC	Environment Canada
ECM	Environmental Compliance Monitoring
EEM	Environmental Effects Monitoring
EHS	Emergency Health Service
ELC	Ecological Land Classification
EMP	Environmental Management Plan
EPP	Environmental Protection Plan
EPT	Ephemeroptera Plecoptera Trichoptera
ESD	Emergency Shutdown (ESD) System
FEED	Front End Engineering Design
FWAL	Freshwater Aquatic Life
GASHA	Guysborough Antigonish Straight Health Authority
GCHA	Guysborough County Heritage Association
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GHGMP	Greenhouse Gas Management Plan
GPS	Global Positioning System
GSC	Geological Survey of Canada
H_2S	hydrogen sulphide
HADD	Harmful Alteration, Disruption or Destruction (of Fish / Fish Habitat)
HASP	Health and Safety Plan
HAZCON	Hazards in Construction
HAZID	Hazard Identification
HAZOP	Hazards and Operability Analysis (hazards analysis techniques for systems, hardware, and procedures)
HSE	Health, Safety and Environment
I-3	Industrial Resource (District 7 Land Use Bylaw)
ICSS	Integrated Control & Safety System
ILCR	Incremental Lifetime Cancer Risk
IMO	International Maritime Organization
ISPS	International Ship and Port Facility Security
ISSC	International Ship Security Certificate
ISO	International Standards Organization
Keltic Project	Keltic Petrochemicals and LNG Project
KMK	Kwilmu'kw Maw-klusuaqn
KO	Knock Out
LAN	Local Area Network
LNG	Liquefied Natural Gas
LOA	Length Overall (boat specification)
LP	Low Pressure
M&NP	Maritimes & Northeast Pipeline
MapleLNG	MapleLNG Limited
MBA	Maritimes Butterfly Atlas

MBBA	Maritime Breeding Bird Atlas
MBCA	*Migratory Birds Convention Act*
MCHE	Main Cryogenic Heat Exchange
MEKS	Mi'kmaq Ecological Knowledge Study
MODG	Municipality of the District of Guysborough
MOF	Marine Offloading Facility
MOU	Memorandum of Understanding
MR	mixed refrigerant
MSDS	Material Safety Data Sheet
MTSA	Marine Transportation Security Act
MTSR	Marine Transportation Security Regulations
N_2O	nitrous oxide
NAFO	Northwest Atlantic Fisheries Organization
NB	New Brunswick
NBCC	National Building Code of Canada
NFPA	National Fire Protection Association
NGL	Natural Gas Liquids
NGSWG	National General Status Working Group
NH_3	ammonia
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NPRI	National Pollutant Release Inventory
NR-1	Natural Resources (District 7 Land Use Bylaw)
NS	Nova Scotia
NSDA	Nova Scotia Department of Agriculture
NSDAF	Nova Scotia Department of Aquaculture and Fisheries
NSDE	Nova Scotia Department of Energy
NSDNR	Nova Scotia Department of Natural Resources
NSE	Nova Scotia Department of Environment
NSEA	*Nova Scotia Environment Act*
NSEL	Nova Scotia Department of Environment and Labour
NSESA	*Nova Scotia Endangered Species Act*
NSF	Nova Scotia Department of Finance
NSFA	Nova Scotia Federation of Agriculture
NSMNH	Nova Scotia Museum of Natural History
NSPI	Nova Scotia Power Inc.
NSTIR	Nova Scotia Department of Transportation and Infrastructure Renewal
NSUARB	Nova Scotia Utilities and Review Board
NSWA	*Nova Scotia Wildlife Act*
NWPA	*Navigable Waters Protection Act*
PDO	Property Damage Only
PEI	Prince Edward Island

PEL	Probable Effect Level
PIRI	Partners in RBCA (Risk-Based Corrective Action) Implementation (various countries; environmental program)
PM	Particulate Matter
PM_{10}	PM with aerodynamic diameter less than a nominal 10 micrometers
$PM_{2.5}$	PM with aerodynamic diameter less than a nominal 2.5 micrometers
POL	petroleum-oil-lubricant
QRA	Quantitative Risk Assessment
RBCA	Atlantic Risk-based Corrective Action
RCMP	Royal Canadian Mounted Police
RMP	Risk Management Plan
ROW	Right-of-Way
SAR	Species at Risk
SARA	*Species at Risk Act*
SBMMP	Sulphide Bearing Materials Management Plan
SO_2	sulphur dioxide
SOCC	Species of Conservation Concern
SOEI	Sable Offshore Energy Inc.
SO_x	sulphur oxides
SOLAS	Safety of Life at Sea
SQG	Sediment Quality Guidelines
TC	Transport Canada
TERMPOL	Technical Review Process of Marine Terminal Systems in Transhipment Sites
the Agency	Canadian Environmental Assessment Agency
the Project	Goldboro LNG Project
the Proponent	Pieridae Energy (Canada) Ltd.
TOR	Terms of Reference
TSP	total suspended particulates
TSS	total suspended sediments
UNESCO	United Nations Educational, Scientific and Cultural Organization
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator
VEC	Valued Environmental Component
VHF	very high frequency
VOC	Volatile Organic Compound
WHMIS	Workplace Hazardous Materials Information System
WHO	World Health Organization
WL	wetland
WNS	White-Nose Syndrome

LIST OF UNITS

%	percent
µg/kg	micrograms per kilogram
µg/L	micrograms per litre
µg/m^3	micrograms per cubic metre
µS/cm	microseimens per centimetre
µS/m	microseimens per metre
barg	bar gauge
cm	centimetre
dB	decibels
dB (LA_{max})	decibels (Maximum Sound Level)
dB (L_{eq})	decibels (Equivalent Sound Level)
dB re 1 µPa	decibel micropascals
dB(A)	decibels (A-Weighted)
dB(Lin)	decibels (Unweighted)
dbh	diameter breast height
g/s	grams per second
ha	hectare
kg	kilogram
km	kilometre
km/h	kilometres per hour
km^2	square kilometre
kVA	kiloVolts-amps
kW	kilowatt
kW/ m^2	kilowatt per square metre
L	litre
L/d	litres/day
Ldn	Day-night level
LPM	litres per minute
m	metre
m/s	metres per second
m^2	square metres
m^3	cubic metres
m^3/d	cubic metres per day
m^3/h	cubic metres per hour
mbar (g)	millibars (gauge)
Mcf/d	million cubic feet per day
mg/kg	milligrams per kilogram
mg/L	milligram per litre
mg/m^3	milligrams per cubic metre
mg/m^3 (n)	milligrams per cubic metre (normal)
mg/Nm^3	milligrams per (normal) cubic metres
MJ/m^3 (s)	megajoules per cubic metre (standard)
mm	millimetre
MMscf	million standard cubic feet
mol%	mol percent
Mt	million tonnes
Mtpa	million tonnes per annum

MW	megawatt
NCU	Nephelometric Turbidity Units
ng/L	nanograms per litre
ºC	degrees Celsius
ppb	parts per billion
ppm	parts per million
ppmv	parts per million (volumetric)
ppt	parts per thousand
RPM	revolutions per minute
scf	standard cubic feet
t	tonne (metric ton)
t/d	tonnes per day
t/y	tonnes per year
V	volt
vol%	volume percent
vpd	vehicles per day

SECTION 1.0
INTRODUCTION

GOLDBORO LNG

1.0 INTRODUCTION

Pieridae Energy (Canada) Ltd. (Pieridae) is the Proponent of the proposed Goldboro LNG Project (the Project). The proposal entails the development and operation of a natural gas liquefaction plant and Liquefied Natural Gas (LNG) tanker terminal in Goldboro, Guysborough County, Nova Scotia (NS).

In 2013, Pieridae prepared an Environmental Assessment (EA) report to fulfill obligations pursuant to the NS Environmental Assessment Regulations for a Class II undertaking.

On October 20th, 2013, the Minister of the Environment referred the EA report to an EA Review Panel for review. The EA Panel in turn invited the public to submit written comments up to December 16th, 2013.

On December 19th, 2013, following the review of all submissions, the EA Review Panel notified the public that it had decided that a public hearing would not be required. Instead, the EA Review Panel requested that Pieridae addresses questions and comments raised during the comment period that ended on December 16th, 2013. On January 8th, the Review Panel published another notice stating that a second period for written public comments had commenced and that comments would be accepted until January 24th, 2014. The Panel asked Pieridae to provide responses to the comments of the second review period by 31 January, 2014.

This Information Request (IR) Response Document provides all comments and IRs that the review Panel received during the second review period together with Pieridae's responses. As such, it is referred to as "Information Requests and Proponent Responses – Part Two".

It is of note, all IRs have been re-formatted for the purpose of this report. The original text, however, has been reproduced verbatim to accurately reflect the initial submission.

An electronic version of the IR Response Document (Part Two) is available for downloading on the Project website (www.GoldboroLNG.com) and the website of Nova Scotia Environment: http://www.novascotia.ca/nse/ea/goldboro-lng.asp. The first IR Responses Document, i.e. the report on the comments and IRs from the first public review period remains available on the above web-sites.

Both web sites also provide access to Pieridae's Environmental Assessment Report including all of its appendices.

SECTION 2.0

ENVIRONMENTAL ASSESSMENT REVIEW PANEL (EARP)

GOLDBORO LNG

Preamble:

Reference: *Environment Assessment Report*. p. 3-34 & 3-35 (Utilities, Infrastructure and Support Systems)
Gaghan, S. (director). *Syriana*. 2005. Warner Brothers Whittenton N., Granger, R. and Walker, C. 2013. *Waterborne Surveillance For Enhanced Security*. Marine Technology Magazine. 54(11): 17-20

Previous comment: Are there plans for any security systems aimed specifically at detecting terrorist activities?

Pieridae response: "A risk assessment will be undertaken during the FEED. As part of that terrorist activity risks will be assessed. If the risk is considered significant, then systems will be designed into the plant to mitigate the risk."

Request:

Pieridae seems to be only focusing on plant-related infrastructure. What about terrorist activity arriving by sea? For example, see the article by Whittenton et al. (2013) and, if possible, view the terrorist activity depicted in the final 10 minutes of the movie Syriana.

Response:

The risk assessment undertaken during the FEED includes all facilities within the Project both onshore and offshore.

Further, following EA approval, security and security risks will be subject to comprehensive studies to ensure that the Goldboro LNG Project complies with the International Ship and Port Facility Security (ISPS) Code*. For the LNG facility (on-shore and marine components) this means compliance with the Canadian *Marine Transportation Security Act* (MTSA) and the associated *Marine Transportation Security Regulations* (MTSR).

The MTSR provides a framework to detect security threats and take measures to prevent security incidents that could affect marine vessels and their facilities. The Regulations take a risk-based approach and require a comprehensive security assessment and the development of a marine facility security plan.

Similarly, LNG vessels will be required to be compliant with ISPS Code/MTSA. As these vessels will neither be owned nor operated by Pieridae, this is beyond Pieridae's direct responsibility. However, the Goldboro LNG facility security plan will require vessels to carry an International Ship Security Certificate (ISSC) as a condition of arrival. That certification needs to comply with the ISPS Code and MTSA respectively. As such it

requires vessel owners/operators to assess vessel–specific security issues and to implement a vessel security plan.

The MTSA and MTSR are administered by Transport Canada (TC). As per guidance obtained from TC, Pieridae will address the above referenced security issues in close consultation with TC but outside of the TERMPOL process.

* Note:

In December 2002, in response to the events of September 11, 2001, the International Maritime Organisation (IMO) adopted the International Ship and Port Facility Security Code (ISPS Code) as well as amendments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS) to significantly enhance the deterrence, prevention and detection of acts that threaten security in the marine transportation sector. Canada implemented the Code through the MTSR, which came into force on July 1, 2004, established under the authority of section 5 of the *Marine Transportation Security Act* (MTSA).

Pieridae Energy Canada Ltd.	Nova Scotia Environmental Assessment Board	IR Date: January 24, 2014	Page 1 of 1
GOLDBORO LNG	Proposed Natural Gas Liquefaction Plant and Marine Terminal Goldboro, Nova Scotia	Information Requested by: Scott Dickey – EA Review Panel Member Nova Scotia Environment	IR # EARP 59

Preamble:

Reference: *Environmental Assessment Report*. P. 10-146 (Effects on Employment and Local Economy)

Request:

Should Pieridae sell the project, how will Pieridae's efforts to maximize benefits to local businesses and contractors be passed on to buyer? What measures will be put in place (if any) to ensure the buyer will uphold Pieridae's commitments to maximize local benefits?

Response:

Efforts to maximize economic benefits to local businesses and contractors are part of the commitments Pieridae is making in the EA document. An approval of the EA is expected to require the implementation of these and all other commitments. It would be the intent of Pieridae, in any negotiation with a prospective buyer, to fully transfer all rights and obligations of the Project, including commitments formulated as part of the EA.

Pieridae Energy Canada Ltd.	Nova Scotia Environmental Assessment Board	IR Date: January 24, 2014	Page 1 of 1
GOLDBORO LNG	Proposed Natural Gas Liquefaction Plant and Marine Terminal Goldboro, Nova Scotia	Information Requested by: Scott Dickey – EA Review Panel Member Nova Scotia Environment	IR # EARP 60

Preamble:

Reference: *Environmental Assessment Information Requests & Proponent Responses*. IR – HC13.

Request:

Has Pieridae consulted with residents close to the project site who are expected to suffer noise exposures above guidelines limits during operational phase of the project? If so, can Pieridae provide a summary of the sentiments of the potentially affected residents? Are they aware that re-location is among the mitigation measures being considered?

Response:

Pieridae has identified the residents close to the Project site but has not yet consulted with them directly. The noise modeling conducted during the EA is preliminary in nature and identified the potential for impacts at these locations as far as night time noise levels are concerned.

During FEED the Project design will be advanced with specific consideration for noise mitigation. Should the mitigation scenarios involve receptor locations and/or possibly relocations, communication and negotiations with property owners would obviously need to take place to explore the feasibility of that approach.

Pieridae would commit to fully engage these residents regarding noise impacts, and would implement mitigation measures to fully satisfy their concerns.

SECTION 3.0

GOVERNMENT AGENCIES

GOLDBORO LNG

Pieridae Energy Canada Ltd.	Nova Scotia Environmental Assessment Board	IR Date: January 17, 2014	Page 1 of 1
GOLDBORO LNG	Proposed Natural Gas Liquefaction Plant and Marine Terminal Goldboro, Nova Scotia	Information Requested by: Dr. Robert Strang Concerned Citizen	IR # NSHW 2

Preamble:

Based on the answers provided by Pieridae Energy (Canada) Ltd. in the Goldboro LNG Environmental Assessment Document, to our initial comments, the Environmental Health Responsibility Centre of the Department of Health and Wellness offers the following comment regarding this project:

Request:

- Please ensure that the distance between the site and the residences at 250m and 300m meet Nova Scotia Environment's setback distances required for this type of operation.

This is sent on behalf of Dr. Robert Strang, Medical Officer of Health for Guysborough Antigonish Strait Health Authority.

Nita MacLean
Environmental Health Consultant
Nova Scotia Health and Wellness

Response:

The required building setbacks for industrial developments in Guysborough County are described in the Municipality of the District of Guysborough Land Use Bylaw (as amended April 10, 2013) (http://www.municipality.guysborough.ns.ca/sites/default/files/Permits-and-Zoning/LAND%20USE%20BYLAW.pdf).

The Goldboro LNG Project is located in land zoned as Industrial Resource I-3; which is addressed in the Land Use Bylaw, Section 19 (page 46). Setbacks to residential properties are defined and this information has been incorporated into the preliminary design and will be complied with in refining the plot plan during FEED.
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Pieridae Energy Canada Ltd.	Nova Scotia Environmental Assessment Board	IR Date: January 16, 2014	Page 1 of 2
GOLDBORO LNG	Proposed Natural Gas Liquefaction Plant and Marine Terminal Goldboro, Nova Scotia	Information Requested by: Allison Denning Regional EA Coordinator Health Canada, Atlantic Region	IR # HC16

Preamble:

Thank-you for your e-mails dated December 17, 2013 and January 10, 2014, containing the CB&I Noise Study and proponent's response to Health Canada's original comments (Health Canada letter dated December 9, 2013). Health Canada has reviewed the two documents is providing the following comments for your consideration.

Original Health Canada Comment:

Section 10.4.1 (Air Quality and Climate Change (GHG), Threshold for Determination of Significance) and **Section 10.13.1.3 (Human Health)** – A significant adverse air quality effect has been determined to "represent a condition where regulatory objectives are regularly exceeded". "Regularly" is not defined. Given that some of the contaminants of concern (COCs) can have adverse effects on people from acute or short-term exposure (e.g., NO_x and SO_2 are respiratory irritants), individual exceedences of regulatory objectives may result in adverse health effects. As such, the toxic effects of the individual COCs should be taken into consideration when defining "regularly".

- The proponent should define how many times regulatory objectives can be exceeded in order for the effect to be considered significant, with consideration of the individual toxicity of each COC.

Proponent's Response:

There were no predicted air quality exceedences for the Project. A regular exceedence would have been considered one that is associated with regular plant operation as opposed to emissions associated with specific situations such as start up, shut down and malfunctions.

Request:

Health Canada was requesting that the proponent define "regularly", or quantify the frequency and duration of any exceedence that would be considered significant. Given that the air dispersion modelling was based on Pre-FEED (Front-End Engineering and Design) information, and is subject to change based on the results of the FEED process, it is important to define "regularly" in order to determine whether or not a significant adverse effect on air quality may result based on updated modelling that is to be undertaken post-FEED.

Response:

As mentioned, the model identified no exceedances. All predicted ground concentrations remained well within the maximum permissible ground level concentrations as specified in the NS Air Quality Regulations and the NSEA. In the determination of the significance of an adverse effect on air quality, key considerations are the magnitude of the effect and the frequency/duration. As far as the magnitude is concerned this is measured against the established air quality standards and definitions of exceedances.

TSP, CO, NO_2, SO_2 are regulated by Nova Scotia and an exceedance is defined as any predicted concentration greater than the Nova Scotia objective. These standards have been established for different time periods (e.g., 1 hr, 24 hrs, annual) and generally take into account the toxicity of a pollutant (i.e. the more toxic, the higher the standard ever for a short time period). $PM_{2.5}$ is regulated under the CCME Canada Wide Standards and an exceedance for this parameter is defined as the 3 year average of the annual 98^{th} percentile of the daily 24 hour average concentrations.

As far as frequency is concerned, Pieridae considers an exceedance of any of the standards as significant that occurs regularly, meaning:

- is associated with the regular operation of the facility (i.e. not a result of start up and malfunctions);
- is predictable and sustained; and
- is frequent (e.g., more than 10 times per year for the 24 hour criteria).

To provide a more precise definition is not considered appropriate as it is typically discussed specific to a pollutant, and the extent and circumstances of the exceedance and would also consider input from the regulator.

Given the conservative nature of the dispersion model applied in the EA and the detailing of air quality controls during FEED, it is anticipated that the updating of the modeling during FEED will confirm the conclusions from the EA. The re-run of the model is expected to be a requirement by NSE as part of Pieridae's application for an industrial approval under Part V of *Nova Scotia Environment Act*. It is anticipated that the approval will also establish monitoring obligations for Pieridae to demonstrate that the facility indeed meets regulatory standards when it is operating.

Preamble:

Thank-you for your e-mails dated December 17, 2013 and January 10, 2014, containing the CB&I Noise Study and proponent's response to Health Canada's original comments (Health Canada letter dated December 9, 2013). Health Canada has reviewed the two documents is providing the following comments for your consideration.

Original Health Canada Comment:

Section 10.4.1 (Threshold for Determination of Significance) – The report discusses $PM_{2.5}$ in then in the fourth paragraph of this section states "*Health Canada provides a reference value of inhalation of 3 µg/m^3 for an annual period; Quebec has an objective of 10 µg/m^3 for a 24 hour period; and Alberta has an objective of 30 µg/m^3 for a one hour period*." None of these inhalation values are referenced, thus it is not possible to determine which substance(s) they refer to. In Section 10.4.3.5 (Air Dispersion Modeling Methodology), page 10-37, these same values are presented in relation to benzene.

- The proponent should clarify in **Section 10.4.1** whether or not the values presented are for benzene and literature references for all values should be provided.

Proponent's Response:

Section 10.4.1 does present values for benzene; however, the text referencing Health is not accurate and should have read as follows:

"*A value of 3 µg/m^3 was calculated based on the Health Canada Turmorigenic [sic] Concentration 05 (TC05) and this value will be compared to predicted results for longer averaging periods (annual). Quebec has an objective for benzene of 10 µg/m^3 for a 24 hour period and Alberta has an objective of 30 µg/m^3 for a one hour period*."

Website Reference: http://www.hc-sc.gc.ca/ewh-semt/pubs/contaminants/hbct-jact/index-eng.php

Request:

Additional Health Canada Comment:

Health Canada had requested that all references be provided, however, the references for the benzene objectives from Alberta and Quebec were not presented in the response. In addition, the Health Canada document cited is from 1996, and has been

archived because it has been superseded by newer guidance (Health Canada 2010)[1]. The proponent should use the most recent guidance when citing appropriate reference values.

Response:

Health Canada link for benzene:

http://publications.gc.ca/collections/collection_2012/sc-hc/H128-1-11-638-eng.pdf

Alberta link for benzene:

http://environment.gov.ab.ca/info/library/8768.pdf

Quebec link for benzene:

http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=2&file=%2F%2FQ_2%2FQ2R4_1_A.htm

[1] Health Canada. 2010a. Federal Contaminated Site Risk Assessment in Canada, Part II: Health Canada Toxicological Reference Values (TRVs) and Chemical-Specific Factors. Version 2. Prepared by the Contaminated Sites Division, Safe Environments Directorate. September

Pieridae Energy Canada Ltd.	Nova Scotia Environmental Assessment Board	IR Date: January 16, 2014	Page 1 of 2
GOLDBORO LNG	Proposed Natural Gas Liquefaction Plant and Marine Terminal Goldboro, Nova Scotia	Information Requested by: Allison Denning Regional EA Coordinator Health Canada, Atlantic Region	IR # HC18

Preamble:

Thank-you for your e-mails dated December 17, 2013 and January 10, 2014, containing the CB&I Noise Study and proponent's response to Health Canada's original comments (Health Canada letter dated December 9, 2013). Health Canada has reviewed the two documents is providing the following comments for your consideration.

Original Health Canada Comment:

10.4.3.5 Air Dispersion Modeling Methodology - Since a literature reference was not provided for the Health Canada inhalation reference value of 3 µg/m^3, it is unclear whether this is an appropriate value. Health Canada's published inhalation unit risk for benzene (benzene is considered a carcinogen via the inhalation route of exposure) is 0.0033 (mg/m^3)$^{-1}$ (Health Canada, 2010)[1]. An inhalation unit risk is not directly comparable to an environmental concentration. Instead, the unit risk value represents the incremental lifetime cancer risk (ILCR) that would be estimated if a person were exposed to an air concentration of 1 mg/m^3 of that contaminant on a 24-hour continuous basis for every day of their life. For benzene, the unit risk value is 0.0033 (mg/m^3)$^{-1}$, which means that a person exposed to a benzene air concentration of 1 mg/m^3 on a continuous lifetime basis would have an ILCR of 3.3 x 10-3 (or 3.3 in 1,000) due to this exposure. The calculation of an ILCR using a unit risk value is as follows:

ILCR = Time-Adjusted Lifetime Air Concentration (µg/m^3) x Unit Risk (µg/m^3)$^{-1}$

- The proponent should provide a literature reference for the reference value of 3 µg/m^3 cited as being from Health Canada. In addition, if the 3 µg/m^3 is actually a unit risk value (which should be 0.0033 (mg/m^3)$^{-1}$ or 3.3 (µg/m^3)$^{-1}$), the ILCR should be calculated and compared to Health Canada's acceptable value of 1 x 10^{-5} (or 1 in 100,000 increased lifetime cancer risk).

Proponent's Response:

Website Reference: http://www.hc-sc.gc.ca/ewh-semt/pubs/contaminants/hbct-jact/index-eng.php

[1] Health Canada. 2010a. Federal Contaminated Site Risk Assessment in Canada, Part II: Health Canada Toxicological Reference Values (TRVs) and Chemical-Specific Factors. Version 2. Prepared by the Contaminated Sites Division, Safe Environments Directorate. September

Request:

Additional Health Canada Comment:

The reference cited is not the most recent guidance from Health Canada; the most recent guidance (i.e. Health Canada, 2010)[1] should be used instead of this outdated source. In order to calculate the potential cancer risk from future exposure to benzene, the incremental lifetime cancer risk (ILCR) should be calculated using the equation provided above and compared to Health Canada's acceptable value of 1×10^{-5}.

Response:

Comment noted. If applicable, Health Canada (2010) guidance document will be used; potential cancer risk from future exposure to benzene will be established by calculating the incremental lifetime cancer risk (ILCR) using the equation provided above and compared to Health Canada's acceptable value of 1×10^{-5}.

Please also note response to IR# 19 and the supplementary model results for cumulative ground level concentrations for benzene.

Pieridae Energy Canada Ltd.	Nova Scotia Environmental Assessment Board	IR Date: January 16, 2014	Page 1 of 2
GOLDBORO LNG	Proposed Natural Gas Liquefaction Plant and Marine Terminal Goldboro, Nova Scotia	Information Requested by: Allison Denning Regional EA Coordinator Health Canada, Atlantic Region	IR # HC19

Preamble:

Thank-you for your e-mails dated December 17, 2013 and January 10, 2014, containing the CB&I Noise Study and proponent's response to Health Canada's original comments (Health Canada letter dated December 9, 2013). Health Canada has reviewed the two documents is providing the following comments for your consideration.

Original Health Canada Comment:

Section 10.4.3.5 (Air Dispersion Modeling Methodology) (page 10-37) – With respect to total VOCs, benzene was selected as the surrogate parameter to model (representing all VOCs), and modelling was conducted for gas leakage from valves, fittings, storage tanks, vents, etc. which would occur during natural gas liquefaction processing. There is no discussion about background concentrations of benzene or evaluation of cumulative effects of releases of benzene from the project and the nearby SOEI plant. According to Environment Canada's National Pollutant Release Inventory[1], the SOEI plant reported releasing 21.9 tonnes of VOCs to the atmosphere through stack/point and fugitive releases in 2012. Benzene emissions for the SOEI plant, which were reported until 2005, were 0.01 tonnes in 2005. Given that background benzene concentrations and current emissions from the SOEI plant were not used in the emissions calculations, predicted future benzene concentrations may be underestimated.

- The proponent should evaluate all benzene sources, including the existing SOEI plant in calculating future benzene concentrations at the site boundary and at the nearest residences.

Proponent's Response:

It is agreed that background levels of benzene were not accounted for in the assessment document. During FEED the air dispersion model will be updated to include the SOEI plant as a source of benzene emissions, and the model will be re-run to include both the proposed Goldboro LNG plant and the SOEI plant as benzene sources.

Request:

Additional Health Canada Comment:

Health Canada is concerned that if the FEED process is conducted subsequent to the approval of the environmental assessment for this project, the information contained in the EA report may not represent the most accurate information about potential project emissions. Any additional modifications during the FEED process may therefore not be

[1] Environment Canada. 2012. National Pollutant Release Inventory. Facility and Substance Information. http://www.ec.gc.ca/inrp-npri/donneesdata/index.cfm?do=facility_substance_summary&lang=en&opt_npri_id=0000005012&opt_report_year=2012

subject to any formal provincial approval process. As such, there is a substantial amount of uncertainty associated with the results and conclusions of this EA report and any modifications made following the approval of the EA may not be subject to additional review.

Response:

In response to HC's concern, ground concentrations for benzene were calculated to supplement the information provided in the EA report. The following table provides an assessment of cumulative benzene effects from the major sources of benzene in the Goldboro area. Both the SOEI gas plant and the proposed Goldboro LNG facility were included as sources in the model. An emission rate for the SOEI gas plant was calculated based on the 2005 NPRI reporting information for benzene for this facility. It should be noted that for most of the life of the Goldboro LNG Project, the predicated annual concentration in Table 1 is considered conservative since the SOEI gas plant will likely not be operating at the same time as the Goldboro LNG Project (currently the SOEI gas plant is expected to be closed by 2018). However, it is possible there may be a year or two overlap between the two projects.

Table 1 Assessment of Benzene Cumulative Effects

Pollutant	Averaging Time Period	Highest Annual Ground Level Concentration (GLC)	Health Canada TC05 Concentration
Benzene ($\mu g/m^3$)	Annual	0.058 (608361,5002069)	3

It is of note that following EA approval and prior to operation, Pieridae will be required to obtain an industrial approval pursuant to Section V of the *Nova Scotia Environment Act*. As part of the approval application, Pieridae will have to demonstrate that the Project meets all applicable regulatory standards for air quality. This will be based on the results of the final air quality model for the final development plan that will be defined during FEED. It is expected that, as part of the approval, NSE will establish monitoring obligations, in order for Pieridae to demonstrate the facility's regulatory compliance during actual operation.

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GOLDBORO LNG	Proposed Natural Gas Liquefaction Plant and Marine Terminal Goldboro, Nova Scotia	Information Requested by: Allison Denning Regional EA Coordinator Health Canada, Atlantic Region	IR # HC20

Preamble:

Thank-you for your e-mails dated December 17, 2013 and January 10, 2014, containing the CB&I Noise Study and proponent's response to Health Canada's original comments (Health Canada letter dated December 9, 2013). Health Canada has reviewed the two documents is providing the following comments for your consideration.

Original Health Canada Comment:

Section 10.5.2.2 (Effects of Operation) - references a noise dispersion modelling study performed by CB&I to model off-site noise impacts. This noise dispersion modelling study was not provided with the EA report. In order for Health Canada to evaluate the accuracy of the predicted noise model results, the noise dispersion modelling study, including model inputs and output sheets containing the assumptions used in the predictions, should be provided.

- The proponent should provide the noise dispersion modelling study, including a discussion of all of the model input parameters utilized in predicting future operational noise levels and software output sheets in order for Health Canada to evaluate their appropriateness and assess the validity of the noise model results.

Proponent's Response:

The preliminary Noise Study (CB&I 2013, Rev.C, Doc# 185 352 - 000 - ME - RP - 00001) has been provided (Appendix 2). It includes details of model inputs and software output.

Please note that the results are indicative only. A full noise study based on final plant layout, contours and specific equipment data will be carried out during FEED.

Request:

It is unclear how there can be any confidence in the information contained in the EA report given that the Noise Study report is preliminary and noise sources/levels are subject to change during the FEED process.

Response:

The purpose of the preliminary noise report is to understand the potential extent of noise and potentially affected receptors. The simplified study allows the Project to advance the design during FEED with specific consideration for noise mitigation including possibly measures at the affected receptor locations and/or relocation of receptors. This can only be achieved with the final plot plan, site terracing and equipment design.

During FEED the noise modelling will be applied in an iterative process wherein the effectiveness of various mitigation measures will be tested and adjusted / expanded as per the model results until the model shows that the guidelines are being met. Should the mitigation scenarios involve receptor locations and/or relocations, communication and negotiations with property owners would obviously need to take place to explore the feasibility of that approach.

It is of note that following EA approval, Pieridae will be required to obtain an industrial approval pursuant to Section V of the *Nova Scotia Environment Act*. As part of the approval application, Pieridae will have to demonstrate that the Project meets the Provincial noise guidelines. This will be based on the results of the final noise model for the final development plan. It is expected that, as part of the approval, NSE will establish monitoring obligations, in order for Pieridae to demonstrate the facility's regulatory compliance during actual operation.

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GOLDBORO LNG	**Proposed Natural Gas Liquefaction Plant and Marine Terminal Goldboro, Nova Scotia**	**Information Requested by:** **Allison Denning** **Regional EA Coordinator** **Health Canada, Atlantic Region**	**IR #** **HC21**

Preamble:

Thank-you for your e-mails dated December 17, 2013 and January 10, 2014, containing the CB&I Noise Study and proponent's response to Health Canada's original comments (Health Canada letter dated December 9, 2013). Health Canada has reviewed the two documents is providing the following comments for your consideration.

Original Health Canada Comment:

10.5.1 (Acoustic Environment, Threshold for Determination of Significance) - A significant adverse noise effect is defined as representing "*a condition where the recommended guidelines are regularly exceeded*". Regularly is not defined. The report then states that a continuous operational noise level of 60 dBA (24 hours/day) is predicted at the three residential receptors located closest to the site. The Nova Scotia guideline for acceptable noise levels for the evening is 60 dBA and for the night-time is 55 dBA. Thus, on a daily basis noise levels will exceed the provincial guideline during the night-time.

- The proponent should define "regularly".
- Given that noise levels are expected to exceed provincial noise guideline on a daily basis, it would appear that this should constitute a significant effect. The proponent should justify why they do not consider the predicted noise levels to constitute a significant adverse effect.

Proponent's Response:

a) In the definition of significant adverse noise, the word regularly means "during normal operation". This would not include occurrences of noise that may be caused by start up, malfunctions, or accidental events.
b) The plot plan, site topography, and equipment specifications will be advanced during FEED considering noise emissions. As part of that effort, the noise model will be detailed and re-run to predict the effectiveness of the refined design and associated noise abatement measures. If at that stage (after design refinement and noise modeling) noise levels at receptors are still predicted to be above the Nova Scotia guidelines, further noise mitigation measures will be developed. This would include the consideration of mitigation at the receptor site(s) and possibly relocation of affected receptor(s).

Request:

Health Canada was requesting that the proponent define "regularly", or quantify the frequency and duration of any exceedence that would be considered significant. The noise modelling was considered preliminary and did not include all potential noise

sources; nevertheless, exceedences of provincial noise criteria were predicted at the three nearest residences. Given that the potential noise levels (locations and durations of operational noises) are subject to change based on the results of the FEED process, it is important to define "regularly" in order to determine whether or not a significant adverse effect on noise levels may result based on updated modelling that is to be undertaken post-FEED.

Response:

As far as frequency is concerned, Pieridae considers an exceedance of the noise guideline levels as significant if it occurs regularly, meaning:

- is associated with the regular operation of the facility (i.e. not a result of start up and malfunctions);
- is predictable and sustained; and
- is frequent (e.g., occurs on a daily or weekly basis).

On the basis of this definition the preliminary noise model predictions would be considered significant adverse effects. The final significance rating in the EA; however, reflects the significance of residual adverse net effects (i.e. effects that remain after the implementation of mitigation measures).

The preliminary noise model submitted to HC does not present the magnitude and extent of residual adverse net effects as it does not take comprehensive mitigation measures into account. The purpose of the preliminary noise report was to understand the potential extent and magnitude of noise levels and the potential number and location of affected receptors. From the preliminary model it can be concluded that the concern related to noise is limited in its geographic extent and magnitude.

The simplified noise study allows the Project to advance the design during FEED with specific consideration and targets for noise mitigation including possibly measures at the affected receptor locations and/or relocation of receptors. This can only be achieved with the final plot plan, site terracing and equipment design.

Based on the preliminary noise model results and experience with comparable industrial facilities, Pieridae is confident that, during regular facility operation, noise guidelines can and will be met. As such the evaluation of the adverse residual net effects for noise was determined to be "not significant". This of course will have to be demonstrated as part of the application process for an industrial approval under Part V of the *Nova Scotia Environment Act*. It is expected that, as part of the approval, NSE will also establish monitoring obligations, in order for Pieridae to demonstrate the facility's regulatory compliance during actual operation.

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GOLDBORO LNG	Proposed Natural Gas Liquefaction Plant and Marine Terminal Goldboro, Nova Scotia	Information Requested by: Allison Denning Regional EA Coordinator Health Canada, Atlantic Region	IR # HC22

Preamble:

Thank-you for your e-mails dated December 17, 2013 and January 10, 2014, containing the CB&I Noise Study and proponent's response to Health Canada's original comments (Health Canada letter dated December 9, 2013). Health Canada has reviewed the two documents is providing the following comments for your consideration.

CB&I Noise Study report

Section 8.2 (Wind and Ambient Conditions) states that the noise modelling software assumes that the wind blows equally from all directions. In order to be conservative in modelling noise, it is important to assume weather conditions that are favourable to sound propagation. Thus, when modelling noise for the proposed project, it should be assumed that all receptors are located downwind of the noise sources, that the wind speed is between 2 m/s (metres/second) and 5 m/s during the daytime or more than 0.5 m/s at night, and no strong, negative temperature gradient occurs near the ground (e.g. when there is no bright sunshine during the day) (ISO 1996-2:2007[1]).

Request:

The proponent should use the most conservative assumptions when predicting future operational noise levels, otherwise noise levels may be underestimated.

Response:

The noise modelling during FEED will be based on conservative assumptions and will use Soundplan software which is based on ISO 9613-2-1996. This includes wind modelling per ISO 1996 (1987) which allows for wind speeds of 1 m/s and 5 m/s. Soundplan additionally assumes that the wind is blowing in all directions including towards all receptors.

It is of note that the facility also requires an industrial approval under Part V of the *Nova Scotia Environment Act*. As such the approach to and outcome of the noise modelling during FEED will also be discussed with the Provincial regulator as part of the application process.

[1] ISO. 2007. Acoustics - Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels. ISO 1996-2:2007.

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GOLDBORO LNG	Proposed Natural Gas Liquefaction Plant and Marine Terminal Goldboro, Nova Scotia	Information Requested by: Allison Denning Regional EA Coordinator Health Canada, Atlantic Region	IR # HC23

Preamble:

Thank-you for your e-mails dated December 17, 2013 and January 10, 2014, containing the CB&I Noise Study and proponent's response to Health Canada's original comments (Health Canada letter dated December 9, 2013). Health Canada has reviewed the two documents is providing the following comments for your consideration.

CB&I Noise Study report

Section 8.4.2 (Noise Model) states that given the early stage of the Project, the noise model is a simplified one and the data incorporated does not represent an extensive list of sources that can be expected at a gas liquefaction plant. Given that there are predicted exceedences of provincial night-time noise criteria at the nearest residences based on this simplified modelling, if all potential noise sources were included in the model, it is expected that predicted noise levels would be even higher than those presented.

Request:

The proponent should provide additional justification to show that the noise modelling is conservative and representative of a reasonable-worst-case scenario during typical plant operations. Any proposed mitigation measures to reduce noise levels should also be provided with a sufficient level of detail to enable Health Canada to review and evaluate their noise reduction potential.

Response:

The purpose of the preliminary noise report was to understand the potential extent of noise and potentially affected receptors. The study identified three receptors that could experience noise levels beyond night time guideline levels. As such the study demonstrates that the concern related to noise is limited in its geographic extent and magnitude. During FEED, the Project design will be advanced with specific consideration to reducing the noise to meet all provincial guideline levels.

During FEED, the noise modelling will be applied in an iterative process wherein the effectiveness of various mitigation measures will be tested and adjusted / expanded as per the model results until the model shows that the guidelines are being met. Should the mitigation scenarios involve receptor locations and/or relocations, communication and negotiations with property owners would obviously need to take place to explore the feasibility of that approach.

Based on the preliminary noise model results and experience with comparable industrial facilities, Pieridae is confident that, during regular facility operation, noise guidelines can

and will be met. This of course will have to be demonstrated as part of the application process for an Industrial approval under Part V of the *Nova Scotia Environment Act*. The material to be submitted in support of the application will entail such information as the final plot plan, details on noise mitigation measures, and equipment specifications. The final model run will be based on conservative assumptions and will use Soundplan software which is based on ISO 9613-2-1996 (includes wind modelling per ISO 1996 (1987)) (see also response to IR 22).

It is expected that, as part of the approval, NSE will also establish monitoring obligations, in order for Pieridae to demonstrate the facility's regulatory compliance during actual operation.

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GOLDBORO LNG	Proposed Natural Gas Liquefaction Plant and Marine Terminal Goldboro, Nova Scotia	Information Requested by: Darrell Taylor, Water Quality Specialist, Science division, NS Environment	IR # NSE6

Preamble:

RE: Goldboro LNG Project Class II Environmental Assessment - 2nd Public Comment Period

Request:

11. I have reviewed the forwarded EA documents for the above referenced project. I have no further comments to provide – although I do wonder how water withdrawal requirements for the current project can be reduced to about 1/60 of that proposed for the Keltic project. I assume this can be achieved through process changes and engineering controls, which are beyond my area of expertise.

    Thanks for the opportunity to participate in the review process.

Response:

11. The main reason that the process water requirement is so much less than for the Keltic project is that Pieridae chose to use an air cooled (rather than water cooled) system for the LNG process. This was among the "other methods for carrying out the project" considered during preliminary design development and is discussed in the EA Report, Section 7.6 (Process Cooling), page 7-3. The environmental benefits were a significant factor in selecting the air cooled design.

Preamble:

Staff of the Department of Communities, Culture, and Heritage have reviewed the registration document for the second public comment period for the Goldboro LNG Project and have provided the following comments:

Request:

1. Archaeology

Staff has reviewed the sections on archaeology in the revised September 2013 EA document for the Goldboro project. This is a huge undertaking and several areas of archaeological sensitivity have been identified through ARIAs as Sections 9.12 and 10.16 outline. There is a recognition that several archaeological resources have been identified and there may be more not yet identified or to be accidentally discovered. Section 10.16 has the following statement that is very useful regarding future work: "As the Project design progresses through FEED stages, the actual potential for impacts will be reassessed and further studies may be necessary. In the event that ground disturbing activities are planned in the vicinity of the other identified locations, particularly those with high sensitivity, then mitigation will be required."

Section 10.16 also highlights a pre-construction and construction phase mitigation measures including awareness and sensitivity training for construction workers, communication protocols and archaeological monitoring and contingency protocols. These are all positive things to see and a good approach forward. There is awareness of the potential for further archaeological work and a plan to move forward with that work. As long as this plan is upheld, there are no archaeological concerns.

2. Botany

Staff has reviewed this document with respect to previous concerns in the botanical field studies. It is still unclear to if “AMEC personnel” were botanists, geologists or engineers. It lends credibility to a study to know that the field personnel are experienced or have expert knowledge of the species of conservation concern. It is request that these generalized statement about studies be made specific. It is unclear as to who conducted the botanical surveys.

3. Geology

The EA documents do not comment in any way on palaeontology.

This project will disrupt rocks from the Meguma Supergroup. Possibility of encountering fossils is very low, although trace fossils may be a slight possibility.

Response:

1. Archaeology

Pieridae will abide by all commitments made in the EA Report and conditions of all subsequent permits and approvals. We look forward to working with NS Communities, Culture, and Heritage in developing the scope of the various studies and monitoring/operating plans.

2. Botany

As outlined in the field reports provided in Appendix D of the EA, the field surveys for the Goldboro LNG Project were carried out by highly qualified AMEC personnel.

Habitat, wetland and rare lichen surveys in September 2012 were carried out by AMEC botanists Dr. Marion Sensen and Scott Burley, M.Sc. Dr. Sensen is a botanist with specialization in lichens and 25 years experience with vascular plants and lichens, Mr. Burley is a botanist with seven years experience. They have extensive practical experience identifying Nova Scotia's plant and lichen species at risk and species of conservation concern. Both also have training, accreditation and extensive experience in the identification, delineation and functional assessment of wetlands.

Complementary habitat, wetland and rare plant surveys in June 2013 were carried out by AMEC botanist Scott Burley, M.Sc. (see above), and field assistant Leah Darche, B.Sc., a biologist with an additional Environmental Engineering Technology Diploma and 1 year experience.

3. Geology

Information noted. We understand the likelihood of encountering fossils is very low.

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GOLDBORO LNG	Proposed Natural Gas Liquefaction Plant and Marine Terminal Goldboro, Nova Scotia	Information Requested by: Edward Parker Fisheries and Oceans Canada	IR # DFO2

Preamble:

DFO comments on the Environmental Assessment Report for the Goldboro LNG Project

Request:

Fisheries and Oceans Canada (DFO) has reviewed the September 2013 Environmental Assessment Report (the Report) as well as the Information Requests and Proponent Responses dated January 10, 2014 for the Goldboro LNG Project whereby Pieridae Energy (Canada) Ltd. is proposing the development and operation of a natural gas liquefaction plant, liquefied natural gas (LNG) tanker terminal, and associated marine facilities in Goldboro, Guysborough County, Nova Scotia.

DFO awaits final design details of the project components interacting with the marine and freshwater environments to carry out its regulatory duties pursuant to the fisheries protection provisions of the *Fisheries Act* as well as sections 32, 33 and 58 of the *Species at Risk Act* that apply to aquatic species.

DFO acknowledges that Pieridae Energy (Canada) Ltd. is consulting and working with fishing interests to address potential impacts on resource access and use. This engagement process, in conjunction with the fishing vessel operations survey being prepared under Transport Canada's Technical Review Process of Marine Terminal Systems and Transshipment Sites (TERMPOL), should be used to collect, present and validate detailed information on fishing activity in the area. DFO will provide support through its participation in the TERMPOL process, as well as through the provision of advice for the marine fisheries offset plan and environmental effects monitoring program. DFO will also ensure that an updated departmental report covering ecologically and biologically significant areas in the project area is provided to the proponent upon its completion in 2014.

DFO will continue participating in the ongoing Aboriginal consultations in fulfillment of the Government of Canada's duty to consult with First Nations, prior to issuance of an authorization for serious harm.

Response:

Pieridae is looking forward to working with DFO on off-set plans and will provide final designs to facilitate the application for authorization pursuant to the *Fisheries Act*. A first TERMPOL meeting took place on 23rd January 2014 and a survey of fishing vessel operations has been established as part of the overall work program. Pieridae continues to engage Aboriginal communities, GCIFA, and individual fishermen in the advancement of Project designs and operational plans. Pieridae will stay in close communication with DFO representatives for updates and to obtain DFO feedback and input including the DFO report covering ecologically and biologically significant areas.

Preamble:

DNR has been requested to review the proponent's response to the first public comment period for the Environmental Assessment document and provides the following comments.

Request:

General Comments & Recommendations:

Wildlife: comments submitted by Mark Elderkin and Sherman Boats, Biologists

1.0 Flaring and Monitoring:

We acknowledge the proponent's commitment to undertake monitoring and management of flaring to assay and mitigate impacts on birds and bats if the project is approved. Evidence on the impacts of flaring on migratory birds and bats is scant. This is because few approvals for undertakings relating to gas flaring have required developers to systematically monitor impacts on birds. As well, published studies on the impacts of flaring on wildlife worldwide are rare. However, following a mass mortality event at the CANPORT LNG plant in New Brunswick in 2013, there has been serious concern that flaring may well be significant and largely overlooked source of mortality in birds. Most of the details around the CANAPORT incident have not been publically released as investigation is still pending. What is known from experts working on the file is that the single night event where +/- 7,500n birds were killed could likely have been prevented. Furthermore, it is known that the duration of bird mortality likely extended over days or even weeks before and after the night where the bulk of mortality took place. This serious bird mortality event was tied to flaring that was required to manage and avoid potential safety issues probably related to equipment failure and rising gas pressures in the storage facility. It is possible, that if pro-active and seasonal management of gas storage had been in place, such mortality risk could be reduced, or eliminated. Cornell University Bird Laboratory has a predictive digital tool (See response to Mark Pulsifer, NSDNR questions) for forecasting when and where bird migration fall-outs may occur. However, this tool is only a model at this point and it has not yet been tested and validated in Canada. Clearly the model has promise. The tool did accurately forecast major migration fallout of birds would occur somewhere in the Bay of Fundy the very night the 7,500 birds perished at CANAPORT but it did not predict or assay chronic mortality associated with migration that also was occurring in the days/weeks before and after the major point of incident at CANAPORT. While the tool has good potential it is essential that monitoring be conducted to provide data that will validate and improve the model at local and regional scales. This data will improve our ability to address bird mortality issues while minimizing impacts on gas storage operation.

As one of the largest LNG plants in Atlantic Canada, Goldboro by virtue of its coastal proximity and location would be ideally situated to provide for and benefit from research,

monitoring and modelling the impacts of LNG operations on birds and bats. NSDNR and EC would look forward to the opportunity to work with Goldboro LNG and the research community to coordinate investment and research as required as a condition for the approval for this project. Furthermore, a seasonal gas management plan is needed to address the full breadth of environmental and economic risks. The plan would use a pro-active approach to manage tgas at certain times of year such that contingency or an emergency posed through equipment failure does not require burning gas for weeks at a time in peak times of bird and bat migration. Seasonal management planning of gas and associated flaring combined with investment in research and monitoring should significantly reduce the risks migratory birds and bats.

1.1 Recommendation: That a condition for the project's approval be that the company monitor and undertake research on the impacts of gas flaring on birds and bats through radar, onsite monitoring and an adaptive seasonal gas management plan for 4 years from date of operation. Methodologies and approach to research, monitoring for assaying impacts on birds and bats and the seasonal management of gas flaring activities must be developed with NSE, NSDNR, Wildlife Division and CWS.

1.2 Recommendation: That a condition for the project approval be that the company must monitor impacts of flaring and lighting on the colony of Leach's Petrels on Country Island for a period not less than 4 years from the date of the project's full operation.

2.0 Mainland Moose

The average home range for a moose is 25 to 40 square kilometers in area and long-term survival within a landscape and persistence over time is a product of the sum of all of its parts. Habitat fragmentation, maintenance of landscape connectivity, wetlands, thermal cover and over wintering areas all are important for long-term persistence of moose populations. Moose sign was found within the proposed development area during the environmental assessment for the Goldboro LNG project and the species is well known to occur in that area by the NSDNR. While the assertion by the proponent that core habitat has not been identified under the *NS Endangered Species Act* is true, the absence of its identification under law in no way should be misconstrued to mean that the general prohibitions against knowingly destroying the dwelling place of this endangered mammal is null, void and non-applicable to this undertaking . On Crown Lands the emphasis on protecting moose habitat through affecting special management practices (SMPs) shows that nobody should be exempt from applying the intent of the law, if not the letter of the law even in absence of identification of core habitat. Similarly here the company is expected to recognize its responsibilities where a known net loss of moose habitat can be reasonably inferred if the development proceeds. Furthermore as indicated in earlier discussions with the company, it is our concerted opinion that the project's development, infrastructure and operation will incur impacts on moose directly onsite that will extend for several kilometers in all directions beyond its approved operating footprint. While the company's response to NSDNR's questions has been

informative on their perspective and useful in assessing the potential impacts on moose a formal approval condition to clarify the extent, expectation and focus of future mitigation is in our opinion necessary.

2.1 Recommendation: That a condition for the project's approval be that the company monitor and undertake research on endangered mainland moose onsite and offsite to document landscape level impacts on moose and habitat use. Methodologies, approach and scope of research and monitoring required by the company on mainland moose must be developed with NSE, and NSDNR, Wildlife Division.

3.0 Wetlands

Impacts on wetlands are significant both through high functional loss and the number of wetlands negatively affected. Wetland compensation funds should be directed to restoration of endangered species habitat located elsewhere in Nova Scotia.

3.1 Recommendation: That a condition for the project's approval be that the company compensate for loss of wetlands onsite through allocation of monies of the Wetland Compensation Fund to restore wetland habitat of a globally imperilled plant known as Mountain Avens (*Geum peckii*) on Brier Island, Digby County listed as endangered under SARA and the *NS Endangered Species Act*.

4.0 General Approval Conditions Recommended

4.1 That the proponent agrees to submit copies of all digital wildlife survey data for significant habitats, species at risk and those of conservation concern in the form of shape files and point location information to the NS Department of Natural Resources, Wildlife Division as a pre-condition for the project's approval.

4.2 That the proponent agrees to submit an annual progress report with results and all data to a standard as defined by NSDNR from monitoring mainland moose and another report summarizing bird/bat monitoring. Both reports should be submitted by January 15th in each calendar year to NSE, and NSDNR and Environment Canada.

4.3 Site preparations that include deforestation, clearing and grubbing should be undertaken between September 1st and April 15th in order to minimize impacts on breeding birds that may include endangered and threatened species listed under SARA and/or *NS Endangered Species Act* during spring and summer months.

Response:

Pieridae agrees with the recommendations formulated by NSDNR (Points 1.1, 1.2, 2.1, 3.1 and 4.1, 4.2 and 4.3). They represent mitigation and monitoring measures as well as contributions to recovery programs that Pieridae referred to in the EA Report. Pieridae looks forward to working with NSDNR Wildlife Division, NSE, and CWS in developing further details and specifics for the various efforts.

It is of note that the wetland compensation recommended under Point 3.1 represents compensation outside of the watershed within which the loss of wetland functions will occur. The Province's wetland policy typically requires that such compensation is realized within the same watershed. Pieridae therefore agrees to the proposed monetary contribution to the wetland project on Brier Island (Digby County) under the condition that this is also accepted by NSE as an appropriate compensation for the Project's on-site wetland losses.

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GOLDBORO LNG	Proposed Natural Gas Liquefaction Plant and Marine Terminal Goldboro, Nova Scotia	Information Requested by: Beata Dera, Senior Consultation Advisor NS Office of Aboriginal Affairs	IR # NSOAA2

Preamble:

On behalf of the Nova Scotia Office of Aboriginal Affairs (OAA), I have taken the opportunity to review the Information Requests and Proponent Responses regarding the Goldboro LNG Project in Guysborough County, NS, as proposed by Pieridae Energy Canada Ltd., and offer the following comments:

Request:

1. It is understood that the Mi'kmaq of Nova Scotia have raised a number of concerns with the Mi'kmaq Ecological Knowledge Study (MEKS) update completed for the Goldboro LNG project. It is also understood that the Proponent considers the MEKS to be complete. Both the Proponent and the Mi'kmaq have indicted their willingness to meet and discuss the MEKS further. OAA recommends that the Proponent continue discussions with the Mi'kmaq through the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO) to better understand Mi'kmaq interests, traditional use, and current use in the project area.
2. The Proponent indicated that a Mi'kmaq representative from Paq'tnkek First Nation was invited to participate on the CLC. The Proponent is encouraged to coordinate with the KMKNO the appropriate representation of the Mi'kmaq on the CLC.
3. The Mi'kmaq have requested from the Proponent, the completion of a Mi'kmaq Fisheries Study as well as a Mi'kmaq fisheries communication plan, in order to identify and understand any potential impacts to fish, fish habitat and Mi'kmaq fishing activity. It is the recommendation of OAA that the Mi'kmaq Fisheries Study as well as the Mi'kmaq fisheries communication plan be completed by the Proponent. Should the Mi'kmaq Fisheries Study identify impacts on Mi'kmaq fishing activity, it is expected those impacts will be accommodated.

Response:

1. Pieridae notes the Office of Aboriginal Affairs' interest in collaboration between the Project and the First Nations. The Project will continue to liaise with the KMKNO in accordance with the Memorandum of Understanding between the two parties, and the subsequent Collaborative Benefits Agreement. This will include discussions on the best approach to advance understanding of Mi'kmaq interests, traditional use, and current use in the Project area.
2. Pieridae will continue to work with KMKNO to ensure full Mi'kmaq representation on the CLC in accordance with the terms and procedures of this committee. Accordingly, the KMKNO will be provided the schedule and minutes of all meetings.
3. Pieridae has noted the OAA's support for a Mi'kmaq fisheries communication plan, and will continue to discuss means to accommodate the KMKNO's needs with respect to communication as part of the Collaborative Benefits Agreement.

Pieridae has also noted the OAA's recommendation for the completion of a Mi'kmaq Fisheries Study. Pieridae will continue to discuss the objectives, design and implementation of such a study as part of the ongoing benefits discussions. It is also Pieridae's intention to further discuss any proposed study with the Department of Fisheries and Oceans, the Nova Scotia Department of Fisheries and Aquaculture and the Atlantic Policy Congress of First Nations Chiefs' Fisheries Department to ensure any research undertaken in a collaborative manner is consistent with their programs, activities and needs.

Preamble:

Thank you for the opportunity to review the proponent's responses to Environment Canada's (EC) December 16, 2013 comments on Environmental Assessment Report Submitted by Pieridae Energy (Canada) Ltd. for the above-noted project. It is understood the proponent will prepare a final response to the comments submitted during this second review period and that the Environmental Assessment Review Panel will then submit its report and recommendations to the Minister of Environment for a decision on the project. To assist in the process as described the comments below are offered for consideration.

Request:

IR# EC1
EC appreciates the proponent's commitment to developing and implementing an environmental effects monitoring program for Roseate Tern and implementing adaptive measures as required. EC would support inclusion of this commitment in the terms and conditions of any subsequent approval of the project.

IR# EC-2
EC appreciates the proponent's commitment to confirm the presence and location of species at risk and to implement avoidance and mitigation measures as part of an Avian Management Plan. EC would support inclusion of the commitment to prepare and submit for review an Avian Management Plan in the terms and conditions of any subsequent approval of the project.

IR# EC-3
EC appreciates the proponent's commitment to incorporating EC recommendations regarding lighting and flare operation as part of the Avian Management Plan. EC would support inclusion of the commitment to prepare and submit for review an Avian Management Plan in terms and conditions of any subsequent approval of the project.

IR# EC-4
EC appreciates the additional information on the presence and location of Kildeer as part of the 2013 surveys and the commitment to incorporating EC recommendations regarding compliance with *Migratory Birds Convention Act* as part of the Avian Management Plan. EC would support inclusion of the commitment to prepare and submit for review an Avian Management Plan in the terms and conditions of any subsequent approvals of the project.

IR# EC-5
EC appreciates the commitment to incorporate EC recommendations on measures regarding wildlife as part of spill response plans. EC would support inclusion of the commitment to prepare such plans in the terms and conditions of any subsequent approval of the project.

IR# EC-6

The proponent's response states *"...included in Fire and Explosion Reports and/or Quantitative Risk Assessments will be events that are considered credible for a facility such as this*", and "*This would normally not include a full/double containment LNG tank failure as described. A failure such as this would be considered beyond the scope of the worst-probable-case (credible) due to the highly unlikely nature of the event*.", EC would like to take this opportunity to highlight statistics taken from IChemE[1] that indicate, for a compilation of 43 incidents in the petrochemical industry where overpressures were created, of which 32 were in industrial plants, 13 (or 30%) were attributed to vessel failure. Although EC acknowledges that these statistics are not specific to the LNG sector, EC remains of the view that vessel failures should not be considered beyond the scope of a worst-probable-case (credible) scenario.

EC appreciates the Proponent's response that "*Other large-scale events will be considered (e.g. those associated with any condensate tanks ect.). Low probability events such as LNG tank failure may still be included in Quantitative Risk Assessments, at which point their probability will be considered alongside the hazard, this would be decided when writing the scope for these studies.*" Although there are some specific advantages associated with the reliance on quantitative risk assessments over qualitative risk assessments, there are a proportionate number of disadvantages[2] to consider as well. EC is of the view that the two approaches should not be used independent of each other and that optimal emergency planning should first consider a qualitative assessment that would form a basis, and would or could be supported by a more detailed quantitative assessment.

In simpler terms, EC takes the approach that emergency planning should consider that worst-case accident scenarios are possible and that it is in both the proponents' and the public's best interests for proponents to plan around that assumption. According to the OECD[3]', "*All hazardous installations should have an adequate on-site emergency plan, which is appropriate for that installation and is based on a complete range of accident scenarios, including most probable releases and worst-case scenarios. The range of possible scenarios should include an identification of the potential risks and the geographical zones where effects are likely to occur in the event of an accident. The zones should indicate, inter alia, the public potentially affected and those areas for which decisions concerning evacuation, sheltering in place, or other actions to limit exposure*

[1] IChemE, Lee's Loss Prevention in the Process Industries, Hazard Identification, Assessment and Control, Volume 2, 17.28.1 "Vapour Cloud Explosion Incidents", pp. 1509

[2] Liovin, A. Master of Science Thesis, Systematization of international knowledge concerning "worst-case scenario" approach. General guidelines for application of the approach in purposes of industrial safety. Royal Institute of Technology, 2007, 44pp.

[3] , OECD Guiding Principles for Chemical Accident Prevention, Preparedness and Response – Guidance for Industry (including Management and Labour), Public Authorities, Communities, and other Stakeholders, Second edition, 2003, 209pp.

may have to be taken. The identification of such zones should also provide an indication of the nature and extent of resources that may be needed in the event of an accident."

With respect to proponent's indication that Quantitative Risk Assessments will be conducted at a future time, EC requests the opportunity to review such plans once they are drafted as part of the current environmental assessment process. EC also recommends that, to be complete, any such risk assessments must include the modelling of a worst-case scenario as defined in CRAIM 2007[4] as: *"...the release of the greatest quantity of a hazardous substance, held in the largest container, whose impact distance is the greatest, and takes into consideration passive but not active mitigation measures.*" If the consequences results of such modelling are found to have likely impacts beyond the extent of the facility (i.e. any consequences that would be found to have impacts to human health and the environment outside of the facility's property boundaries), then EC recommends that modelling for alternative accident scenarios for more-probable yet less-catastrophic accidental releases should be undertaken, thoroughly documented, planned for and incorporated in (at least to some degree) information sharing with the public.

EC appreciates the proponent's commitment to develop an Environmental Management Plan (EMP) which will include a Contingency and Emergency Response Plan. EC would support inclusion of that commitment in the terms and conditions of any subsequent approval of the project and EC requests the opportunity to review both plans once they are drafted.

With respect to the proponent's response that *"...particularly sensitive coastal environments at and near the Project site will be identified (and) established with input from local stakeholders (e.g. Community Liaison Committee) and discussed in that plan component*.", EC recommends that such sensitive coastal shoreline mapping work be guided by the characterization criteria outlined in EC's Arctic SCAT (Shoreline Clean-up Assessment Technique) Manual[5].

IR# EC7
EC is satisfied with the response.

IR# EC-8
EC appreciates the clarification. EC is prepared to review any additional information submitted in support of any subsequent permitting process for wastewater treatment in terms of applicable federal legislation.

[4] Conseil pour la reduction des accidents industriels majeurs (CRAIM), 2007, Risk Management Guide for Major Industrial Accidents, 436pp.
[5] Environment Canada, Emergency Prevention, Preparedness and Response - A Program of the Arctic Council, The Arctic SCAT Manual - A Field Guide to the Documentation of Oiled Shorelines in Arctic Regions, 2004

IR# EC-9
EC appreciates the commitment to incorporate EC recommendations on water quality as it relates to blasting in the Environmental Management Plan for the construction phase. EC would support inclusion of the commitment to prepare an Environmental Management Plan in the terms and conditions of any subsequent approval of the project.

IR# EC-10
EC is satisfied with the response. EC would support inclusion of the commitment to prepare an Environmental Management Plan in the terms and conditions of any subsequent approval of the project.

IR# EC-11
EC is satisfied with the response. EC would support inclusion of the commitment to prepare a Risk Management Plan in the terms and conditions of any subsequent approval of the project.

Should it be determined that the proposed project can proceed, EC is prepared to participate in the review of any documentation and information that the department has recommended for future submission. If you have any questions, please contact me or Stephen Zwicker, who is coordinating the department's participation, at (902)426-0992 or stephen.zwicker@ec.gc.ca.

Response:

IR# EC-1 to EC-5, and EC-7 to EC-11

Pieridae will abide by all commitments made in the EA Report and conditions of all subsequent permits and approvals. We look forward to working with Environment Canada in developing the scope of the various studies and monitoring/operating plans.

IR# EC-6

Catastrophic failure events will be included within the scope of the Quantitative Risk Assessment (QRA) to be completed for the Project. This will provide both a frequency of the event and the consequences specific to the conditions on the Goldboro terminal. These two pieces of information may be considered independently allowing the Project to consider the incidents in terminal design and in emergency planning.

It is believed that to connect the information on Vapour Cloud Explosion release sources given in (EC's) Reference 1 (that 13 of 42 sources of release leading to Vapour Cloud Explosion were vessels) to the likelihood of a full containment LNG tank failure is onerous. There is no clarification within Lees' on the types of vessel failure leading to these Vapour Cloud Explosions or the size of the resultant release; it is likely that they are not catastrophic failure of storage tanks.

Pieridae has reviewed The Arctic SCAT Manual, and will consider the characterization criteria used in that document when developing contingency and emergency response planning (as part of the Project EMP). The scope of and approach to sensitive shoreline identification will be made available to Environment Canada for review and ultimately described in the EMP.

Pieridae Energy Canada Ltd.	Nova Scotia Environmental Assessment Board	IR Date: 24 January, 2014	Page 1 of 1
GOLDBORO LNG	Proposed Natural Gas Liquefaction Plant and Marine Terminal Goldboro, Nova Scotia	Information Requested by: Steven Tattrie Nova Scotia Agriculture	IR # NSA1

Preamble:

Thank you for the opportunity to review the Environmental Assessment document for the proposed Goldboro LNG Project.

Request:

Based on the project site description the project will take place in the Goldboro Industrial Park as well will include the construction of a water line from Meadow Lake. Neither the construction site nor the water line would interfere with agriculture.

The land in this region is non-agriculture and I would have no issue from this perspective of the project.

Response:

Comment noted.

SECTION 4.0

NON-GOVERNMENT ORGANIZATIONS

GOLDBORO LNG

Preamble:

Re: Environmental Assessment for Goldboro LNG Second Public Comment period.

Request:

As we are all aware this is the third environmental assessment for the Goldboro Area. The fourth is you count the Deep Panuke Pipeline. We have had some involvement with all of the Goldboro Assessments, especially the one for Keltic Petrochemicals.

Industrial Pipefitters and Pipe Welders as well as many other trades people get to experience a very wide variety of projects across Canada and around the world. We currently have Members working on an LNG Plant in Australia. The point is we are not unaware of what is considered acceptable on a wide variety of projects over a wide area.

Using Sable Gas Plant and Pipeline as an example of the modern Construction Industry. The property is safe, clean, well kept, well managed and maintained with none of the hazardous predictions of explosions, injury, death and destruction of wildlife predicted in their Environmental Assessment.

In reading the consolidated response to comments from the Review Panel as well as comments from the Public and Government submitted during the Public Comment period that ended on December 16th/2013 I am concerned that this could turn into another expensive, open ended process just like the one for Keltic Petrochemicals did.

We were pleasantly surprised that all of the Public Comments were in support of the Project in the December 16th period.

I notice the Panel required Pieridae to confirm that there was no negative feedback at any of the Open House Sessions regarding the proposed project.

I can personally verify that there was zero negative feedback at any of the open houses. In fact they were very pleasant upbeat events attended by a wide range of people and companies who have a real concern for Economic Development in the outlying areas of the Province.

Our concern is that all the negative comments come from the Panel and Government Organizations.

<u>Roadways</u>

The realignment of Route 316 is the most serious issue and has the potential to kill an 8-10 Billion Dollar privately funded project. We are talking about a 1.2 Kilometer section of a 2 lane highway 40 meters north of and parallel to the existing highway.

The Panel Chair indicates that the proposed Route 316 realignment is only at its very early pre-planning stages when the panels own documents indicate that it was included in Keltic Petrochemicals Environmental Assessment which was accepted Provincially and Federally about seven years ago.

If I remember correctly the Keltic Environmental Assessment took 33 months Provincially and 34 months Federally at a cost of several million dollars.

In my mind it would seem like a conflict of interest for the Panel Chair to be making the argument on behalf of Nova Scotia Transportation and Infrastructure for a Fifth Environmental Assessment of the same property that would add 4 to 6 years to the Environmental Assessment process.

One has to wonder if the intention is to use the Environmental Assessment process to kill Industrial Development in rural Nova Scotia or to maximize the cost to proponents so they will be forced to go elsewhere to develop their Projects.

As an example there are new shopping centers in Halifax/Dartmouth that have a larger footprint than Goldboro LNG, with extensive highway development to service them.

The lighting, disruption to wildlife, vehicle and building emissions, oil, gas and chemical run off from the service highways and parking lots would go untreated into the storm sewers eventually going directly in to Halifax Harbour.

I don't remember seeing anything about Nova Scotia Environment and Nova Scotia Transportation and Infrastructure Renewal teaming up to put unreasonable conditions in place to kill those projects.

<u>Alternatives to the Project - Conservation of Gas for future use - the "do nothing" option</u>

Successive Governments of this Province have already spent hundreds of millions of dollars to prove that they don't have any alternatives to the Goldboro LNG Project.

I find it difficult to understand why Nova Scotia Environment Employees would suggest conservation of gas for future use when the rest of the World is turning to gas as a cleaner energy source.

Most of the gas for Goldboro LNG will not come from Nova Scotia and the vast majority of the gas currently produced offshore Nova Scotia is going out of Province, primarily to US markets. Prevailing weather patterns bring the exhaust back to Nova Scotia.

The comment about a "do nothing approach" is a complete insult to the taxpayers of this Province. I don't dispute the fact that there is a high level of expertise in the "do nothing " Departments, it is just that I never seen it expressed in writing before.

Birds

The reference to 7500 Song Birds being killed at Canaport is used repeatedly in the documentation for exaggeration purposes. The truth of the matter is that no such incident has happened at the Sable Gas Plant in Goldboro and Goldboro LNG proposes to do less flaring than the Gas Plant.

This would indicate that the Gas Plant would be a more valid comparison to Goldboro LNG than the Canaport Site.

During the Environmental Assessment for the Sable Project a study was done on the effects on the Roseate Tern. The result was that there was no effect on the Roseate Tern population. Another Roseate Tern study was forced on Keltic Petrochemicals as an additional cost of 100,000.00. The Keltic study produced the same result as the one Sable did, there was no effect on the Tern Population.

The Deep Panuke Pipeline also indicated, no effect on the Tern.

I see Environment Canada indicates that the previous Tern studies cannot be used to conclude that the Tern will not be effected by the construction of the LNG Tanker Terminal which was part of the Keltic Environmental Assessment.

Common sense would indicate that any negative effect on the Roseate Tern would be extremely low.

Wetlands and Wildlife

Using the previous example of shopping centers in Halifax/Dartmouth the Goldboro LNG Project has a small footprint in a comparatively remote low population area of Guysborough County. Contrary to the opinions presented in this Environmental Assessment Document wild animals are extremely versatile when it comes to any human development, especially in an area like Goldboro which is surrounded by unpopulated woodlands and the Atlantic Ocean.

Noise

There are three residential properties in close proximity to Goldboro LNG that would be subject to noise levels of 55db during operation of two LNG Trains.

Provincial guidelines for an 8 hour period is 85 db and the Federal Guideline is 87db.

OSHA guidelines for a 24 hour period is 80db.

I am missing a few pages in the copy of the documentation so I don't know who submitted the document titled New South Wales Construction Noise Guideline which is identified as a (draft).

That would mean that this document was never implemented by the Department of Environment and Climate Change, New South Wales, Australia. It may have some limited use in a City of high rise buildings but it is a joke to adopt such a document for use in Goldboro or anywhere in Nova Scotia for that matter.

Furthermore I don't think that it is the mandate of the Nova Scotia Environment to search for ridiculous programs that will increase project costs for any project proponent that may consider doing business in Nova Scotia.

Department of Health and Wellness

I agree with Pieridae's response that there is no need for sidewalks and bike paths for Construction Workers.

A Trades Person that works on an Industrial Construction Site for 10 or 12 hours a day will not be looking to walk or bike to work. If the bike was built by Harley Davidson it might be a different story.

Think about it, the Department of Transportation can't fix the road without a 4 to 6 year delay. The closest sidewalks to the site would be Antigonish or Guysborough.

Health Canada

I just realized that it was Health Canada that submitted the (Draft) adopted from the New South Wales Construction Noise Guideline, New South Wales, Australia.

Given that this letter has to be submitted by 5:00 PM today I don't have time to re-organize my previous comments on this document. I stand by my previous statements on the subject.

There are current noise guidelines in place, use them.

Local Benefits

Pieridae has supplied an outstanding list of benefits for Government, Business and working people in the Province of Nova Scotia as well committing to Community Activities.

Pieridae responses to information requests

Given the fact that the Nova Scotia Environmental Assessment Board and Nova Scotia Transportation and Infrastructure Renewal have teamed up to threaten the proponent with a 4 to 6 year delay of the Project over 1.2 kilometers of road. That has already been assessed and excepted by Nova Scotia and Canada.

Like the list of Benefits to Nova Scotia Pieridae has also done an outstanding job answering all the requests for information presented to the Company.

I don't know how they managed such a professional response after having their Project threatened but I commend them for it.

Response:

Comments noted.

With respect to the relocation of Route 316, Pieridae would like to clarify that NSTIR is planning on relocating the road in such a way that it by-passes the entire Goldboro LNG facility. This will involve a new route segment that is several hundred meters to the north-east of the existing road. NSTIR is currently in the process of studying specific alignment alternatives and starting and end points of the new re-alignment have not been established yet.

Pieridae Energy Canada Ltd.	Nova Scotia Environmental Assessment Board	IR Date: January 24, 2014	Page 1 of 3
GOLDBORO LNG	Proposed Natural Gas Liquefaction Plant and Marine Terminal Goldboro, Nova Scotia	Information Requested by: Twila Gaudet, Kwilmu'kw Maw-klusuaqn Negotiation Office	IR # KMKNO2

Preamble:

Thank you for your letter dated December 20th, 2013 providing an update on the above noted. KMKNO has taken the opportunity to review the Pieridae response to the first public comment period on the Goldboro LNG Project, Guysborough County, Nova Scotia.

At this time, we wish to provide you with our comments, concerns and/or recommendations regarding Pieridae's response to our comments in our letter to Nova Scotia Environment dated December 16th, 2013:

Request:

1. Any impacts to Mi'kmaq Rights and Title should be addressed by the Crown through consultation under the Terms of Reference with the Mi'kmaq of Nova Scotia.
2. We commend the proponent in providing the opportunity for the Mi'kmaq of Nova Scotia to participate on the Community Liaison Committee (CLC). Again, I wish to reiterate that Mi'kmaq participation on the CLC should be coordinated through KMKNO's Consultation Department. I also wish to note that Mi'kmaq participation on the CLC will be for information purposes only, and all discussions regarding Food- Social-Ceremonial fishing activity should be discussed with KMKNO directly.
3. It is strongly recommended that Pieridae establish a Fisheries Advisory Committee for any commercial fisheries that may be impacted by the development of this project as communications through the CLC would be insufficient. It is recommended that an overall communications strategy be developed for any commercial fishing activity occurring in and surrounding the project area.
4. The Pieridae's response indicated "The Mi'kmaq Ecological Knowledge (MEKS) Study updated for the Goldboro LNG Project (EA Report, Appendix L) found several references to burial sites within Guysborough County, but no archival reference or archaeological evidence of the Aboriginal burial or occupation was identified for the Project footprint." The MEKS should not be referenced or considered as a source of information for archaeological resources.
5. KMKNO wishes to note that our office has no record of receiving the draft MEKS for this project on October 13, 2013.
6. Although the proponent is satisfied with the MEKS, it is strongly noted the MEKS completed by AMEC for the Goldboro LNG Project does not meet the requirements of the MEKS Protocol as ratified in November 2007. Therefore, it is recommended that as part of the terms and conditions of the approval that a MEKS be completed in accordance to the MEKS Protocol for this project, which respects the values of Mi'kmaq traditional ecological knowledge. KMKNO understands the proponent will continue to engage the Mi'kmaq of Nova Scotia on all fisheries related issues; however, we still recommend additional work to be

completed by the proponent on any potential impacts to fish, fish habitat, and Mi'kmaq fishing activity and/or Mi'kmaq fishing licenses in and surrounding the project area as this project may have potential environmental and socio-economic impacts on the Mi'kmaq of Nova Scotia. Therefore, we recommend a Mi'kmaq Fisheries Study be completed by a qualified Mi'kmaq marine biologist. Further, we recommend the proponent to develop a Mi'kmaq fisheries communication plan and Mi'kmaq fisheries compensation plan be developed for this project. KMKNO welcomes further discussion with Peiridae on this matter.

7. The Mi'kmaq of Nova Scotia wish to commend the proponent once more for signing a memorandum of understanding, and KMKNO looks forward to continuing to work with Pieridae to develop and sign a collaborative benefits agreement.

We look forward to continued consultation with Nova Scotia Environment on this matter.

Response:

1. Pieridae is aware of and acknowledges the fiduciary relationship between the Crown and Mi'kmaq and will support and contribute to the Crown's consultation efforts on the Project to the best of its abilities.
2. Pieridae notes the KMKNO's interest in collaboration with the Project on behalf of the Mi'kmaq Bands in Nova Scotia. The Project will continue to liaise with the KMKNO in accordance with the Memorandum of Understanding between the two parties, and the subsequent Collaborative Benefits Agreement. Pieridae seeks to have full Mi'kmaq representation on the CLC in accordance with the terms and procedures of this committee. Accordingly, the KMKNO's Consultation Department will be provided the schedule and minutes of all meetings.
3. Pieridae has considered the need for a fisheries advisory committee, and determined that in light of the heavy representation of fishers on the CLC and the historical relationship of the community with the fishery, that a separate fisheries committee will be redundant. As a result, it is understood that fisheries issues will be an important consideration for the CLC and therefore will be a fixed agenda item for all meetings.
4. We believe that KMKNO is referring to EA report Section 9.10.7 (Mi'kmaq Interests), in which it is the MEKS that refers to archaeological information:

> "The Keltic Project MEK study found various references to burial sites within Guysborough County (Membertou Geomatics Consultants, 2005). No archival reference to, or archaeological evidence of Aboriginal burials or occupation was identified for the Project footprint (see Section 9.12 below)." (EA Pg 9-190)

The archaeological resources section of the Goldboro LNG EA Report (Section 9.12) did not use the MEKS as a source of archaeological information.

5. The correct date of transmission of the MEKS was October 17, 2013. A copy of the email is attached.
6. Pieridae has noted KMKNO's concerns respecting the MEKS and the desire for a Mi'kmaq Fisheries Study for the Project. Pieridae will discuss the objectives, design and implementation of such a study as part of the ongoing Collaborative Benefits Agreement discussions. Pieridae's will also discuss the design and methodology of a proposed study with the Federal Department of Fisheries and Oceans, the Nova Scotia Department of Fisheries and Aquaculture and the Atlantic Policy Congress of First Nations Chiefs' Fisheries Department to ensure any research undertaken in a collaborative manner is consistent with their programs, activities and needs.
7. Pieridae is also pleased with the progress towards a positive and ongoing working relationship with the Mi'kmaq of Nova Scotia.

Milley, Chris

From: Milley, Chris
Sent: October-17-13 10:28 AM
To: 'Twila Gaudet'
Subject: Goldboro MEKS- final draft_310713.docx
Attachments: Appendix02-KelticMEKReport.pdf; Goldboro MEKS- final draft_310713.pdf

Twila,

As you will be aware, AMEC has been hired by Pieridae to complete and Environmental Assessment for a Proposed LNG Terminal in Goldboro. It was determined by the proponent and province that this process would build upon the previous EA and associated documents prepared for the Keltic Petrochemical plant proposal which would have been constructed on the same site.

As part of the review of existing documentation, we reviewed the MEKS prepared by Membertou Geomatics and determined that the report should be updated though field studies to determine the presence of culturally significant plants and animals in the immediate vicinity of the project site. AMEC engaged the services of Norma Brown, former Fishery Coordinator Acadia Band, and member of past Harvesters Association to assist AMEC field biologists in conducting this work. No community interviews were held as part of this work, as the original MEKS report was based on extensive community consultation.

I have attached a copy of the update report, and a copy of the past MEKS for your information.

Chris

Preamble:
Goldboro LNG Project Environmental Assessment

Request:
With regard to the proposed Environmental Assessment for project "Goldboro LNG," Bird Studies Canada (BSC) writes to highlight the ecological importance of this area to breeding seabirds and migratory birds and outline concerns surrounding the impacts of artificial lighting on birds, particularly flares.

BSC is a national non-profit organization dedicated to increasing understanding, awareness and conservation of birds and their habitats across Canada. With our partner, Nature Canada, BSC co-manages Canada's Important Bird Area Program (www.ibacanada.ca). Important Bird Areas (IBAs) are sites that are designated globally for their significance to birds and biodiversity. Roughly 600 IBAs have been designated in Canada, 32 of which are in NS.

The proposed Goldboro LNG project will be located in close proximity (within 5 km) of the Country Island Complex IBA. The IBA was designated due to its global significance to breeding Leach's Storm Petrel and endangered Roseate Tern. Particular concerns associated with this project relate to potential disturbance and harm to breeding and migrating birds caused by artificial lighting (specifically gas flares and industrial lights) and increased shipping activities. There is evidence that artificial lighting has caused bird injury and mortality in Atlantic Canada. In September 2013, approximately 7,500 songbirds died at Canaport LNG facility in St. John, NB. The migrating birds were apparently attracted to the lights from the gas flare during foggy conditions. Artificial light particularly affects birds which are active at night[1].

Leach's Storm-Petrel
Environment Canada's Canadian Wildlife Service estimates about 21,000 pairs of Leach's Storm-Petrel breed on Country Island, making it one of the largest breeding colonies in Atlantic Canada. For unknown reasons, the population of breeding storm-petrels on Country Island has declined by over 50% since the late 1990s. This small seabird's breeding season extends from May to October and migration occurs in autumn months (peak in September). It feeds on plankton in marine ecosystems sometimes hundreds of kilometers from its breeding colony. It is active at night and is naturally attracted to light. Attraction to artificial lights at-sea and in coastal areas is well documented[1,2] and can be particularly problematic on foggy, or low moonlight nights. Bright lights can attract and disorient storm-petrels causing them to hit lights (e.g., flares) and hard infrastructure resulting in injury or death[3]. Young storm-petrels are believed to

[1] Montevecchi, W. A. (2006) Influences of artificial light on marine birds. Chapter 5 in C. Rich and T. Longcore, eds. Ecological consequences of artificial night lighting. Washington, D.C.: Island Press.
[2] http://www.birdlife.orgidatazone/sowb/casestudy/488
[3] Wiese et al. 2001. Seabirds at risk around offshore oil platforms in the Northwest Atlantic. Marine Pollution Bulletin 42: 1285-1290.

be particularly vulnerable[4]. Wiese et al. (2001) provide a useful scientific overview as well as recommendations on reducing light emissions, monitoring, and research.

Roseate Tern

With less than 60 breeding pairs remaining in Canada, the Roseate Tern is one of Canada's most imperiled endangered birds. Country Island is a highly significant site for the species, as it is currently one of four known Canadian breeding sites. Environment Canada's Canadian Wildlife Service reports that the island supports 16 pairs of Roseate Tern, representing more than one quarter of the Canadian population. Roseate Terns forage on small fish in shallow coastal waters around Country Island and the surrounding area. Roseate Terns co-occur with breeding Common and Arctic terns, which nest in large numbers on the island and also forage in surrounding waters. Location and abundance of prey fluctuates due to environmental factors, therefore, adult terns must be able to access extensive coastal habitat in order to locate prey to raise their young. Shipping and other industrial activities in the area surrounding the IBA may disrupt breeding adult and young tern's ability to access potential foraging areas. Oil pollution associated with increased shipping activities is another potential threat to this species and its coastal foraging habitats. In addition, bright lights at night are known to disrupt behaviour and interfere with essential activities of some breeding seabirds, thus, minimizing artificial lighting is important (see Wiese et al. 2001).

Migrating Birds

As previously noted, migrating birds can become disoriented by and attracted to artificial lights at night resulting in mortality and injury. The September 2013 event at Canaport LNG facility is direct evidence of this issue. Effective planning to prevent and respond to these events is critical to minimizing impacts. Moreover, rigorous monitoring of the site, particularly during spring and fall migration periods, facilitates assessments on impacts of flares and understanding of underlying factors leading to mortality events (e.g., weather and flare conditions).

We appreciate the opportunity to submit this information and welcome questions (sabbott@birdscanada.org or 902-426-4055). We believe that there are excellent opportunities for this project proposal to respond to these issues and demonstrate leadership in the industry in addressing threats from artificial lights, particularly flares, and using best science to inform adaptive management during all phases of this project.

[4] Imber 1975. Behaviour of petrels in relation to the moon and artificial lights. Notornis 22:302-306.

Response:

Pieridae appreciates the input provided by Bird Studies Canada, and is committed to developing an avian management plan in consultation with regulators and other relevant organizations including Bird Studies Canada. This avian management plan will include an environmental effects monitoring component with mortality monitoring for birds and bats in order to assay the impacts and better understand the poorly-studied phenomenon of avian mortality and injury from artificial lighting, including flares.

Further, Pieridae is committed to developing and implementing effective planning and mitigative measures in order to minimize impacts on migratory birds, including the Roseate Tern and Leach's Storm-petrel. The recommendations in scientific publications such as Weise et al. (2001)[3], as well as input from stakeholders and regulators, will be used to inform Pieridae's planning and mitigation practices.

SECTION 5.0

CONCERNED CITIZENS

GOLDBORO LNG

Preamble (by Pieridae):

During the 2nd Round public comment period ending on January 24th, 2014, the EA Review Panel received comments from 9 individual citizens (numbered 110 to 118). Seven of these submissions represent short messages of general support for the Project and often include a brief rationale based on the expected economic benefits of the Project.

Pieridae recognizes the strong support for the Project within the local and regional communities and acknowledges the many potential direct and indirect benefits attributed by the commenting authors to the Project development.

Pieridae reviewed each one of the individual submissions and assigned them a unique Information Request number (IR #). Collectively they have been referred to as IRs from Concerned Citizens (CC).

Following the review Pieridae decided to not reproduce each one of these submissions in this IR Response Document. Instead, they are summarized in the table below. The original full submissions can be obtained by contacting NSE, EA Review Coordinator.

In the table below, the major topic of each submission is given. Where individuals identified issues/concerns (i.e., other than "Project Support"), or raised questions, these are addressed further in detailed responses. In some cases, names may be misspelled, as many were hand written and at times difficult to read.

Summary of Comments Received from Concerned Citizens		
IR #	**Name (representation)**	**Topic/Key Issue**
CC110	Gary McLaughlin (resident)	Project Support
CC111	Cindy McLaughlin (resident)	Project Support
CC112	Joanne McLaughlin (resident)	Project Support
CC113	Clarice M.Sheehan (resident)	Project Support
CC114	John M. Sheehan (resident)	Project Support
CC115	Blair Chapman (resident)	Project Support
CC116	Gary MacGregor (resident)	Project Support
CC117	David Topitzer (resident)	Accidents, Groundwater, Hazardous Waste, Human Health, Local Economy, Marine Environment, Wildlife
CC118	Stephen Henley (resident)	Air Quality (GHG)

Request:

As identified in the above table, two submissions by concerned citizens went beyond a brief statement of Project support and addressed concerns, made suggestions, or raised questions. These include CC117 (multiple concerns) and CC118 (greenhouse gas).

The complete text of these two submissions with their specific comments/requests has been reproduced verbatim on the following pages. Each is followed immediately by Pieridae's response.

Response:

See following pages.

Pieridae Energy Canada Ltd.	Nova Scotia Environmental Assessment Board	IR Date: January 23, 2014	Page 1 of 1
GOLDBORO LNG	Proposed Natural Gas Liquefaction Plant and Marine Terminal Goldboro, Nova Scotia	Information Requested by: David Topitzer Concerned Citizen	IR # CC 117

Preamble:

Concern for multiple environmental issues.

Request:

I am a homeowner within 12 miles of this site, and I am very much familiar with the plans and implications of the latest proposed LNG facility in Goldboro, NS. I was involved in the opposition to the last proposal by Keltic Energy some years back. This latest proposed venture will not provide the economic benefit that they claim and the environmental downside is much too potentially catastrophic to justify their dubious claims. There would be dumping of waste water into the ocean, possible contamination to underground aquifers, possible explosions, air pollution - both gas and particulate - and a general destruction of the natural and cultural environments. There are too many loose ends and unanswered questions in terms of environmental, social and cultural impact that must be specifically and thoroughly addressed.

Sincerely,

David Topitzer

Response:

Pieridae has thoroughly studied the existing conditions at and near the Project site. Potential adverse effects related to the biophysical and socio-economic environments have been investigated. Where the potential for adverse effects was identified, measures to avoid and/or minimize the effects to acceptable levels were established and included with the proponent's commitments to environmental management. The work concluded that, following the implementation of all mitigation measures, the residual adverse effects are not significant.

Pieridae's work is documented in the Project's Environmental Assessment (EA) Report and complies with the Terms of Reference established by NSE. As such the EA Report also includes a discussion of potential economic Project benefits and the proponent's commitments to maximize these benefits for local and regional communities.

A comprehensive monitoring program will be implemented during Project construction and operation to ensure compliance with approvals / conditions of approval that will be established by the EA process and the required numerous subsequent provincial and federal permits and authorizations.

Pieridae Energy Canada Ltd.	Nova Scotia Environmental Assessment Board	IR Date: January 23, 2014	Page 1 of 2
GOLDBORO LNG	Proposed Natural Gas Liquefaction Plant and Marine Terminal Goldboro, Nova Scotia	Information Requested by: Stephen B. Henley Concerned Citizen	IR # CC 118

Preamble:

Air Quality (Greenhouse Gas)

Request:

Open Cycle Gas turbines for electrical Generation

After review of the description of equipment as submitted by the proponent, I wish to point out that based on the documentation available the proponent plans to use open cycle gas turbines to generate 170 MW of electrical power.

Here is the problem, open cycle gas turbines can produce up to 50% more green house gasses then a combined cycle system utilizing a combination of Rakine cycle and Brayton cycle. Most new power plants today in North America and Europe utilize a form of combined cycle called COGAS. The proponent may wish to install open cycle turbines due to lower cost of initial installation. However long term greenhouse gas reduction must trump initial equipment costs.

To put it all in layman's terms and make it more simple to understand. Using an open cycle to produce electricity as proposed is like connecting a jet engine to a generator and sending hot exhaust gasses to waste in the atmosphere. Alternately a combined cycle COGAS system the hot exhaust gasses are exhausted through a heat exchanger or boiler to produce steam the steam is then directed through a steam turbine to produce more electricity. You can see a more complex system with slightly higher initial costs but greatly reducing green house gasses and impact on the environment.

I submit that the minister approve this project under the condition that the best available technology be utilized to minimize the production of greenhouse gasses. And that open cycle gas turbines be disallowed in favour of combined cycle COGAS system

Respectfully

Stephen B. Henley PE

Response:

The comments regarding power generation are duly noted and the reduction of greenhouse gas (GHG) will be considered in selection of the power plant model during FEED. Following are some specific examples of the design issues that may affect the decision.

For a stand-alone LNG Project of this type it is not practical or cost effective to have combined cycle, due to the relatively low electrical demand and high redundancy

required as borne out by many examples of LNG facilities around the world; we are not aware of any operating LNG production facility that is using combined cycle electrical power generation.

As described, combined cycle power generation utilises heat recovery in the exhaust of the power generation gas turbines to raise steam which is in turn used to generate more electric power. In this way, more power can be generated per unit of fuel gas consumed. Thus, for a given electrical power demand, the amount of fuel consumed and hence GHG emissions can be reduced.

Such an approach however, entails the addition of a steam system where one would otherwise not be required. This not only increases the cost and complexity of the plant but also introduces an additional safety risk for site personnel and significantly increases the usage of raw water and chemicals required to treat water which will need to be assessed against the reduction of GHG.

Pieridae is considering the use of Aero-derivative gas turbines in power generation, dependent on final FEED gas specification. These operate more efficiently and hence can satisfy the same electrical power demand as the industrial gas turbines while consuming less fuel and hence producing less GHG emissions.

A ‘straight swap’ is estimated to reduce the total GHG emissions for the facility by approximately 9% without the significant increase in cost and operability issues, safety risk, and water/wastewater production associated with combined cycle.

A combined gas and steam (COGAS) system is estimated to provide approximately a 14% reduction in the total GHG emissions for the facility, when included with other elements of the project. There is not a large difference in GHG reduction compared to other available technologies, and the final decision will require careful consideration of the other issues.

Pieridae is committed to exploring all reasonable opportunities for minimizing the potential impacts of GHG in consultation with the NSE Climate Change Directorate. As such, Pieridae has committed to developing a GHG management plan. It will identify and evaluate all reasonable alternatives and provide a rationale for the ultimate configuration and operation of the plant. These efforts will continue as the plant is operating and, as new technologies or circumstances arise, GHG reduction measures will be taken whenever feasible.

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