

## GLOSSARY

°C	The symbol for degree Celsius.
<	The symbol for less than.
>	The symbol for greater than.
%	The symbol for percent.
<b>acoustics</b>	The science of sound, including the generation, transmission, and effects of sound waves, both audible and inaudible.
<b>adverse effect</b>	The impairment of, or damage to, the environment or health of humans, or damage to property, or loss of reasonable enjoyment of life or property.
<b>AENV</b>	The abbreviation for Alberta Environment.
<b>aerosols</b>	Small droplets or particles suspended in the atmosphere, typically containing sulphur. They are usually emitted naturally, e.g., in volcanic eruptions, and as the result of anthropogenic, i.e., human, activities such as burning fossil fuels.
<b>airshed</b>	The geographical area associated with movement of air and emissions. An area over which model predictions are made and within which emissions from different facilities interact. Emissions from one airshed are not considered to interact with emissions from other airsheds.
<b>ambient air quality</b>	The quality of any unconfined portion of the atmosphere, open air, surrounding air.
<b>ambient or background sound</b>	The all-encompassing sound associated with a given community site, usually being a composite of sounds from many sources, near and far, with no particular sound being dominant. It does not include the sound of interest, i.e., the sound being measured. Under most environmental noise guidelines, aircraft flyovers and train noise are excluded from measurements of background noise because of their transient nature.

<b>attenuation</b>	The reduction of sound intensity by various means, e.g., distance, air absorption, porous materials, engineered noise controls.
<b>A-weighted decibel</b>	A frequency-response adjustment of a sound-level meter that makes its reading conform, very roughly, to human response. The human ear is most sensitive to sound at mid frequencies, i.e., 500 to 4,000 Hz, and is progressively less sensitive to sound at frequencies above and below this range. A-weighted sound level is the most commonly used descriptor to quantify the relative loudness of various types of sounds with similar or differing frequency characteristics.
<b>baseline</b>	A surveyed condition that serves as a reference point to which later surveys are coordinated or correlated.
<b>baseline information</b>	The current state of the environment or environmental setting for a particular element. This information helps to determine the potential environmental effects of a project by providing an environmental reference point for the element, with which to compare future environmental conditions and potential project effects.
<b>biophysical environment</b>	The components of the earth including: <ul style="list-style-type: none"><li>• land, water and air, including all layers of the atmosphere</li><li>• all organic and inorganic matter and living organisms</li><li>• the interacting natural systems that include components referred to in the previous bullets</li></ul>
<b>BTEX</b>	The abbreviation for benzene, toluene, ethylbenzene and xylene, which are considered the most relevant, to oil and gas operations, of the 39 volatile organic compounds detected by analysis of existing volatile organic compound levels in the Norman Wells local study area. The air quality assessment focuses on the four BTEX compounds.
<b>central airshed</b>	A 250 by 375 km area covering the northern part of the pipeline corridor, including the Little Chicago and Norman Wells compressor stations.
<b>climate</b>	The prevailing weather conditions of an area. Climate is a measure of the long-term averages, i.e., normals, of key atmospheric variables such as temperature, precipitation and wind.

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<b>climate normals</b>	Long-term average conditions of temperature and precipitation.
<b>compressor station</b>	A facility containing equipment that is used to increase pressure to compress natural gas for transportation.
<b>confidence limit</b>	One of the end points of a confidence interval, which is an interval with a specified probability of containing a given parameter or characteristic.
<b>construction Phase</b>	The phase of a project preceding the Operations Phase, during which project facilities and infrastructure are assembled and installed on their foundations, and connected and tested to ensure that they operate as designed.
<b>continuous monitoring</b>	Monitoring using an electronic instrument equipped with a pump.
<b>current climate conditions</b>	For the current air quality assessment, the average conditions over the last five years of available data, i.e., 1996 through 2000.
<b>DB</b>	The abbreviation for decibel.
<b>DBA</b>	The abbreviation for A-weighted decibel.
<b>decibel</b>	The logarithmic unit associated with sound pressure level, sound power level or acceleration level. See sound pressure level and sound power level.
<b>deposition rate</b>	The amount of material deposited over a given area per unit time.
<b>directivity</b>	In a given direction from a sound source, the difference in decibels between the sound pressure level produced by the source in that direction and the space-average sound level of that source, measured at the same distance.
<b>ECO<sub>2</sub></b>	The abbreviation for equivalent carbon dioxide.
<b>EIS</b>	The abbreviation for Environmental Impact Statement.

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<b>energy equivalent sound level</b>	Sound levels vary considerably over time. The energy equivalent sound level ( $L_{eq}$ ) is the energy average sound level over a monitoring time interval. It is a continuous sound level that contains the same sound energy as the actual sound occurring during the time interval. $L_{eq}$ values are typically A-weighted, i.e., the energy average sound level is in dBA. Also the duration of measurement is typically stated, e.g., $L_{eq}(24)$ is the 24-hour equivalent sound level. An $L_{eq}$ value expressed in dBA is a good, single-value descriptor of the annoyance of noise.
<b>environmental effect</b>	<p>For a project, any change that the project might cause in the environment, including any change it might cause to a listed wildlife species, its critical habitat or the residences of individuals of that species, as defined in the <i>Species at Risk Act</i>. Also, any effect of any project-induced change on:</p> <ul style="list-style-type: none"><li>• health and socio-economic conditions</li><li>• physical and cultural heritage</li><li>• the current use of lands and resources for traditional purposes by Aboriginal people</li><li>• any structure, site or thing that is of historical, archaeological, paleontological or architectural significance</li></ul> <p>Also, any change to the project that might be caused by the environment.</p>
<b>equivalent carbon dioxide</b>	The greenhouse gas potential of a compound relative to carbon dioxide. Where $CO_2$ has a GHG potential of 1 in the air quality assessment, $CH_4$ has a potential of 21 and $N_2O$ has a potential of 310, i.e., one $CH_4$ molecule, as a greenhouse gas, is effectively equal to 21 $CO_2$ molecules and one $N_2O$ molecule is equal to 310 $CO_2$ molecules.
<b>facilities</b>	Structures of the gathering and gas pipeline systems, including compressor and pump stations, block valves, pigging facilities, heater stations and meter stations.
<b>flaring</b>	The burning of a jet of waste gas in the open air.
<b>fugitive emissions</b>	Emissions not caught by a capture system.
<b>gap analysis</b>	A technique that identifies and analyzes differences between the current situation and the desired situation.

<b>gas chromatograph</b>	The instrument used in gas chromatography to detect volatile compounds present, also used to determine certain physical properties such as distribution or partition coefficients and adsorption isotherms, and as a preparative technique for isolating pure components or certain fractions from complex mixtures.
<b>gathering pipelines</b>	Four pipelines, also known as laterals, that transport natural gas and NGLs from the anchor fields to the Inuvik area facility. These include the Niglintgak lateral, Taglu lateral, Parsons Lake lateral and Storm Hills lateral.
<b>gathering system</b>	A system of pipelines, compressor stations and other related facilities that gather natural gas and associated NGLs from the anchor fields and transport it to the gas pipeline system located at the Inuvik area facility.
<b>geographic extent</b>	Describes areas on the earth's surface that define the spatial limits or boundaries of data sources and associated products.
<b>GHG</b>	The abbreviation for greenhouse gas.
<b>GNWT</b>	The abbreviation for Government of Northwest Territories.
<b>greenhouse gas</b>	Any of various gases, e.g., CO <sub>2</sub> , CH <sub>4</sub> , NO <sub>2</sub> , that are more transparent to incoming solar radiation than to reflected radiation from the earth and that contribute to the heating of the earth's surface and lower atmosphere in a process known as the greenhouse effect.
<b>human perception of changes in sound</b>	<p>The human perception of noise impact is an important consideration in qualifying the noise effects caused by projects. The following numbers assigned to increases in noise levels are a general guideline:</p> <ul style="list-style-type: none"><li>• 1 to 3 – insignificant because imperceptible</li><li>• 4 to 5 – just-noticeable difference</li><li>• 6 to 9 – marginally significant</li><li>• 10 or more – significant, perceived as a doubling of sound exposure</li></ul>
<b>ice fog</b>	Fog made up of minute ice crystals suspended in the air.
<b>IL</b>	The abbreviation for insertion loss.

<b>insertion loss</b>	The arithmetic difference between the sound level from a source before and after the installation of a noise mitigation measure, at the same location. Insertion loss (abbreviated IL) is typically presented as a positive number, i.e., the post-mitigation sound level is lower than the pre-mitigation level. Insertion loss is expressed in dB and is usually specified per 1/1 octave band, per 1/3 octave band, or overall.
<b>inversion</b>	A situation where a layer of warm air is present above cool surface air, trapping emissions near the surface of the earth.
<b>isopleth</b>	A line on a map connecting places registering the same amount or ratio of some phenomenon or phenomena. With respect to noise, it is a line connecting places with equal predicted noise levels.
<b>km</b>	The metric symbol for kilometres.
<b>km<sup>2</sup></b>	The metric symbol for square kilometres.
<b>km/h</b>	The metric symbol for kilometres per hour.
<b>kmol</b>	The metric symbol for kilomoles.
<b>lateral</b>	A pipe that branches away from the central and primary part of the system.
<b>L<sub>eq</sub></b>	The abbreviation for energy equivalent sound level.
<b>liquid water equivalent</b>	A precipitation amount expressed in liquid water depth.
<b>LSA</b>	The abbreviation for local study area.
<b>m</b>	The metric symbol for metre.
<b>mm</b>	The metric symbol for millimetre.
<b>mechanical turbulence</b>	Irregular air movement in the lower atmosphere resulting from obstructions. Also, turbulence resulting from high wind speed.
<b>meteorology</b>	The atmospheric character of a region.
<b>migratory bird</b>	Any migratory bird as referred to in the <i>Migratory Birds Convention Act</i> , including the sperm, eggs, embryos, tissue cultures and parts of the bird.

<b>mixing height</b>	A measure of the depth of the atmosphere through which mixing of emissions can occur. It exhibits strong daily and seasonal variation.
<b>monitoring</b>	Resolving specific outstanding environmental issues, observing the potential environmental effects of a project, assessing the effectiveness of mitigation measures undertaken, identifying unexpected environmental issues and determining the action required based on the result of these activities.
<b>MSC</b>	The abbreviation for Meteorological Services of Canada.
<b>natural gas</b>	A compressible mixture of hydrocarbons with a low specific gravity that occurs naturally in a gaseous form.
<b>natural gas liquids</b>	Hydrocarbons that are gaseous in the reservoir, but that will separate out in liquid form at the pressures and temperatures at which separators normally operate. The liquids consist of varying proportions of butane, propane, pentane and heavier fractions, with little or no methane or ethane.
<b>neutral conditions</b>	Conditions primarily associated with higher wind speeds or overcast conditions, in the Pasquill-Gifford stability classification method.
<b>NGTL</b>	The abbreviation for NOVA Gas Transmission Ltd.
<b>NGTL interconnect facility</b>	The southernmost point of the gas pipeline where it connects either directly with the natural gas pipeline system in northwestern Alberta or to a third-party extension that subsequently connects to the existing system.
<b>Niglintgak</b>	The anchor field to be developed by Shell. The field includes three well pads, one gas conditioning facility, flow lines and supporting infrastructure. The gas conditioning facility might be barge or land based.
<b>noise</b>	Unwanted sound.
<b>noise contour</b>	On a map, a line that represents equal levels of noise exposure, i.e., an isopleth of equal noise levels.
<b>noise level</b>	Same as sound level, except applied to unwanted sounds.

<b>noise reduction</b>	The numerical difference, in decibels, between an unmitigated condition and a mitigated condition, i.e., with and without a particular noise mitigation measure in place, accounting for the acoustical specifications of the mitigation measure, e.g., insertion loss, transmission loss, and receiving space, e.g., reverberation time, acoustical absorption.
<b>northern airshed</b>	A 150-by-200 km area that includes the production area and the Inuvik area facility.
<b>NRC</b>	The abbreviation for Natural Resources Canada.
<b>Operations Phase</b>	The phase of a project during which the pipeline and associated facilities are operated.
<b>PAI</b>	The abbreviation for potential acid input.
<b>Parsons Lake</b>	The anchor field to be developed by ConocoPhillips and ExxonMobil. Initially, the field will consist of a north pad for the well sites and gas conditioning facility. A second well pad will be developed five to 10 years after the north pad.
<b>particulate matter, respirable</b>	Fine particulate matter that is small enough to be breathed deeply into the respiratory tract. Respirable particle matter has a nominal diameter smaller than 2.5 µm and is referred to as PM <sub>2.5</sub> ). Respirable particulate matter comprises fine particles emitted directly to the atmosphere and particles derived from the transformation of emitted gases, such as sulphur dioxide (SO <sub>2</sub> ), nitrogen oxides (NO <sub>x</sub> ) and volatile organic compounds (VOC).
<b>Pasquill-Gifford stability classification</b>	<p>A method of classifying atmospheric stability as unstable, neutral or stable. It estimates stability on the basis of recent surface-based observations, including wind speed, sun incidence angle, and ceiling.</p> <p>The Pasquill-Gifford-Turner stability values range from 1 to 6. Low values indicate that the atmosphere is unstable and that emissions will be dispersed easily, forming, in the case of visible smoke, high plumes resembling cumulonimbus clouds. Midrange values indicate that the atmosphere is neutral, with possible weak, sporadic buoyancy providing some dispersion. High values indicate that the atmosphere is stable and buoyant forces are weak, trapping emissions close to the ground.</p>

<b>passive monitoring</b>	Monitoring that involves collecting gas or vapour pollutant samples from the atmosphere by diffusion through a static layer or permeation through a membrane.
<b>permafrost</b>	Perennially frozen ground, occurring wherever the ground temperature remains below 0°C for two or more consecutive winter seasons.
<b>pH</b>	The measure of the relative acidity or alkalinity of a liquid. The pH scale ranges from 1 to 14, with 7 being neutral, 1 being the most acidic and 14 being the most alkaline.
<b>pipeline</b>	A line used for transmitting oil, gas or any other commodity and that connects a province with any other province or provinces or extends beyond the limits of a province or the offshore area as defined in Section 123 of the <i>National Energy Board Act</i> .
<b>pipeline corridor</b>	The 1 km-wide area that generally centres on the combined right-of-way for the NGL and gas pipelines, from the Inuvik area facility to the southern terminus.
<b>PM</b>	The abbreviation for particulate matter.
<b>PM<sub>2.5</sub></b>	Respirable particulate matter with a nominal diameter smaller than 2.5 µm.
<b>potential acid input</b>	The sum of the wet and dry deposition of sulphur and nitrogen compounds that have the potential to contribute to acidification of the receiving environment.
<b>ppb</b>	The abbreviation for parts per billion.
<b>precipitation</b>	Any or all of the forms of water particles, whether liquid or solid, that fall from the atmosphere and reach the ground.
<b>production area</b>	The area that encompasses all project components located north of the Inuvik area facility, including Niglintgak, Taglu and Parsons Lake, the gathering pipelines, facilities, infrastructure, and the 1-km-wide area surrounding each of these project components.
<b>project, the</b>	The abbreviation for the Mackenzie Gas Project.
<b>RSA</b>	The abbreviation for regional study area.

<b>RWED</b>	The abbreviation for Resources, Wildlife and Economic Development.
<b>sound level</b>	The A-weighted sound pressure level expressed in dBA.
<b>sound level meter</b>	Device used to measure sound pressure level with a standardized frequency weighting and indicated exponential time weighting for measurements of sound pressure level, or without time weighting for measurement of time-average sound pressure level or sound exposure level.
<b>sound power level</b>	<p>The logarithmic ratio of the instantaneous sound power, i.e., energy, of a noise source to that of an international standard reference power. The sound power level is defined by the following equation where <math>W</math> is the sound power of the source in watts, and <math>W_0</math> is the reference power (<math>10^{-12}</math> watts).</p> $\text{PWL (dB)} = 10 \log(W/W_0)$ <p>Interrelationships between sound pressure level and sound power level depend on the location and type of source.</p>
<b>sound pressure level</b>	<p>The logarithmic ratio of the rms sound pressure to the sound pressure at the threshold of hearing. The sound pressure level (SPL) is defined by the following equation, where <math>P</math> is the rms pressure due to a sound and <math>P_0</math> is the reference pressure (<math>2.0 \times 10^{-5}</math> Pascals).</p> $\text{SPL (dB)} = 20 \log(P_{\text{RMS}}/P_0)$ <p>The SPL is a measure of the physical intensity of sound.</p>
<b>southern airshed</b>	A 300 by 500 km area covering the southern part of the pipeline corridor, including the Blackwater River and Trail River compressor stations, the Trout River heater station and the NGTL interconnect facility.
<b>SPL</b>	The abbreviation for sound pressure level.
<b>stable conditions</b>	Conditions primarily associated with nighttime cooling that results in suppressed turbulence and poor dispersion, in the Pasquill-Gifford stability classification method.
<b>Storm Hills lateral</b>	The gathering pipeline connecting the Storm Hills pigging facility to a connection point at the inlet of the Inuvik area facility.

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<b>stratosphere</b>	A layer of atmospheric air above the troposphere and below the mesosphere extending to about 55 km above the earth's surface, where the temperature begins to increase with altitude.
<b>study area</b>	The area within the spatial boundaries of the scope of the environmental and socio-economic effects assessment.
<b>SUMMA sampling method</b>	A method of sampling volatile organic compounds using SUMMA canisters, which are stainless steel containers each fitted with a pressure valve that is opened manually. Ambient air is drawn in by a pump for a set time, e.g., an hour. The valve is then closed and the container is sent to a lab for analysis of VOCs.
<b>Taglu</b>	The anchor field to be developed by Imperial Oil Resources Limited. It consists of one site, which will include the drill sites, gas conditioning facility, flow lines and supporting infrastructure.
<b>Taglu lateral</b>	The gathering pipeline connecting the Taglu gas conditioning facility to a connection point at the Storm Hills pigging facility.
<b>temperature inversion</b>	<p>A layer in the atmosphere in which temperature increases with altitude. The principle characteristic of an inversion layer is its marked static stability, so that very little turbulent exchange can occur within it. Strong wind shears often occur across inversion layers, and abrupt changes in concentrations of atmospheric particulates and atmospheric water vapour may be encountered on ascending through the inversion layer. Also known as thermal inversion.</p> <p>With respect to noise, thermal inversions can refract and reflect upward-directed sound energy back towards the ground, increasing off-site noise levels and limiting the effectiveness of ground attenuation due to topography and some noise mitigation measures, i.e., noise walls and berms.</p>
<b>thermal turbulence</b>	Turbulence created by solar heating that causes air to either rise or fall.
<b>TL</b>	The abbreviation for transmission loss.
<b>TNRCC</b>	The abbreviation for Texas Natural Resources Conservation Commission.

<b>transmission loss</b>	A measure of the reduction in sound energy resulting from incident sound waves striking a wall, partition or enclosure, and radiating through to the other side.
<b>turbulence</b>	An irregularly fluctuating flow of air. Also, a disturbed state caused by this.
<b>unstable conditions</b>	Conditions primarily associated with daytime heating that results in enhanced turbulence and better dispersion, in the Pasquill-Gifford stability classification method.
<b>UTM</b>	The abbreviation for universal transverse Mercator.
<b>VOC</b>	The abbreviation for volatile organic compound.
<b>volatile organic compound</b>	Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, methane, ethane, metallic carbides or carbonates, and ammonium carbonate, that evaporates readily and participates in atmospheric photochemical reactions, including the formation of ozone.
<b>weather</b>	The state of the atmosphere at a place and time as regards temperature, cloudiness, dryness, sunshine, wind, precipitation and so on.
<b>wet deposition monitoring</b>	The method of calculating the uptake of soluble trace gases into water droplets and ice crystals. It occurs when pollutants are deposited in combination with precipitation, predominantly by rain and snow, but also by clouds and fog.
<b>wetlands</b>	A broad group of wet habitats where the water table is usually at or near the surface, or the land is covered by shallow water.
<b>wind rose</b>	A diagram in which statistical information concerning direction and speed of the wind at a location may be summarized. A line segment is drawn in each of perhaps eight compass directions from a common origin. The length of a particular segment is proportional to the frequency with which winds blow from that direction. The thickness of a segment indicates frequencies of occurrence of various classes of wind speed.