DESIGN PHILOSOPHY

5.1.1 DESIGN APPROACH

The Niglintgak field development will be designed, constructed and operated to meet or exceed all required regulatory requirements and Shell's design standards, guidelines and project procedures. Shell's project procedures incorporate the use of risk management principles and best practices for similar applications.

Shell is committed to the principles of sustainable development and will ensure that these principles are incorporated into all phases of the Niglintgak field development. Optimizing the technical design will include incorporating safety and integrity requirements and managing any negative biophysical or socio-economic impacts.

Key design considerations that have influenced the proposed Niglintgak development plan include:

- designing for a 25-year life, including abandonment and reclamation activities
- using proven technology and designs, wherever feasible, to maintain reliability and safety of operations
- designing for both attended and unattended operations, including remote troubleshooting
- designing facilities for concurrent drilling, construction and operational activities
- reducing surface disturbance within the Kendall Island Bird Sanctuary
- using existing disturbed sites, where feasible
- integrating Niglintgak activities with other parts of the Mackenzie Gas Project
- using prefabricated modules, where possible, to optimize field construction activities
- designing for cold weather operation and start-up

5.1.1 DESIGN APPROACH (cont'd)

- considering future expansion and third-party processing options in design
- designing for flood, ice and permafrost protection

5.1.2 CODES AND STANDARDS

The proposed Niglintgak development requires different sets of codes and regulations to be considered for different components of the production facilities design. The well pad facilities, flow lines and gas conditioning facility equipment will be designed using a similar set of codes, standards and regulations.

The gas conditioning facility substructure will be designed as a marine structure, meeting the requirements of several additional codes and regulations specific to its marine operation.

5.1.2.1 Legislation

The Niglintgak development will comply with all applicable regional, territorial and federal legislative requirements, which include the:

- Inuvialuit Final Agreement
- *Canada Oil and Gas Operations Act* (COGOA) and Regulations
- *National Energy Board Act* (NEBA) Rules, Regulations and Guidelines
- *Canada Petroleum Resources Act* (CPRA) and Regulations
- Canada Oil and Gas Land Regulations
- Transport Canada Acts and Regulations
- Department of Fisheries and Oceans Acts and Regulations
- *Canadian Environmental Protection Act*
- *Canadian Environmental Assessment Act*
- *Mackenzie Valley Resource Management Act* and Regulations
- *Northwest Territories Waters Act* and Regulations
- Canada Labour Code
- Government of the Northwest Territories Acts and Regulations
- International Maritime Organization (IMO) Conventions

5.1.2.2 Design Codes and Standards

In addition to applicable corporate standards, the following might also be used:

- Canadian Standards Association (CSA) Codes and Standards
- National Building Code of Canada
- American Society of Testing Materials (ASTM) Standards
- American National Standards Institute (ANSI) Standards
- American Petroleum Institute (API) Recommended Practices
- American Society of Mechanical Engineers (ASME) Codes and Standards
- National Fire Protection Association (NFPA) Codes and Standards
- Institute of Electrical and Electronic Engineers (IEEE) Standards

- National Electrical Manufacturers Association (NEMA) Standards
- Instrumentation Systems and Automation (ISA) Standards
- Manufacturers Standardization Society (MSS) Codes and Standards
- Appropriate Ship Classification Society Rules and Guides
- Engineering Equipment and Materials Users Association (EEMUA) Technical Guides and Standards

5.2.1 SCOPE

The environmental considerations that influence the design of the Niglintgak development include:

- meteorology
- hydrology, including ice
- hydrogeology, including permafrost
- terrain
- vegetation

Data used to determine the design criteria include:

- site-specific data from the 1970s and from recent field studies for geology and hydrology
- Canadian Atmospheric Environment records and climatic observations collected at surrounding centres, particularly from Tuktoyaktuk
- environmental field work obtained during the Mackenzie Gas Project's environmental impact assessment field studies

See EIS Volume 3, Biophysical Baseline, for additional details on environmental baseline information.

5.2.2 SITE DESCRIPTION

The Niglintgak development will be located within the Mackenzie Delta at the junction of the Middle and Kumak channels. The Mackenzie Delta is the second largest delta in North America and the second largest delta located in an arctic or subarctic region. Active fluvial deposits composed of silt and sand, with wetlands, thermokarst lakes and ponds, characterize the area around the Niglintgak field. Subject to flooding and ice floes, the terrain is continually being modified by the environment.

The Niglintgak development will include three well pads, flow lines from well pads to the gas conditioning facility, and the gas conditioning facility itself. All three well pads will be located at previously drilled well locations and will incorporate as much of the previously disturbed area as feasible.

5.2.2 SITE DESCRIPTION (cont'd)

The north and central pads will be located on Niglintgak Island, the south pad on the east bank of Kumak Channel and the gas conditioning facility in the Kumak Channel. The approximate coordinates of the well pads and gas conditioning facility are:

- north pad E486437 N7690183
- central pad E487944 N7687996
- south pad E490195 N7686685
- gas conditioning facility E489632 N7688086

DATUM: North American Datum (NAD27)
Projection: Universal Transverse Mercator (UTM) Zone 8

The entire Niglintgak development is located within the Kendall Island Bird Sanctuary.

5.2.3 METEOROLOGY

5.2.3.1 Data

The Niglintgak meteorological design is based on meteorological data gathered from Tuktoyaktuk, which is located on the coast of the Beaufort Sea. This data is believed to be more representative of the Niglintgak climate than data from Inuvik, which is located farther inland. Although not as complete as the Inuvik database, the Tuktoyaktuk database has more than 20 years of data from 1971 to 2000. This data is adequate for engineering design purposes. However, it is sparse compared to data available in southern Canada.

Niglintgak's high northern latitude defines its climate, which is arctic, with a moderating influence from its proximity to the Beaufort Sea. The short summer, with periods of 24-hour daylight, is offset by long cold winters with about two months of total darkness in winter.

Measured changes in Mackenzie Delta climate conditions have been documented, and future predictions modelled. The Niglintgak development is located within the Inuvialuit Settlement Region, for which a 1.5ºC increase in annual average temperature has been observed over the last 40 years. Total precipitation rates over the same 40 years have increased by 5.2 mm/a. Results of these trends and modelled future trends are documented in EIS Volume 5, Biophysical Impact Assessment, and will be incorporated into the Niglintgak development design.

5.2.3.2 Temperature

On the basis of the Tuktoyaktuk data, a yearly average daily mean temperature of -10.2ºC is expected at Niglintgak, with a wide seasonal variation. The yearly average daily minimum temperature expected is -13.9ºC (see Figure 5-1). The warmest month is normally July and the coldest is January.

Materials selection will be based on operating at the observed minimum temperature of -50°C. Heat tracing and insulation will be provided.

Daily maximum temperatures average -6.6ºC yearly. Daily maximum temperatures of 30ºC have been reported, but are rare, with an average of zero days per year above 30ºC, and 13.1 days above 20ºC. The design temperature daily maximum currently selected for the Niglintgak cooling system is 25ºC.

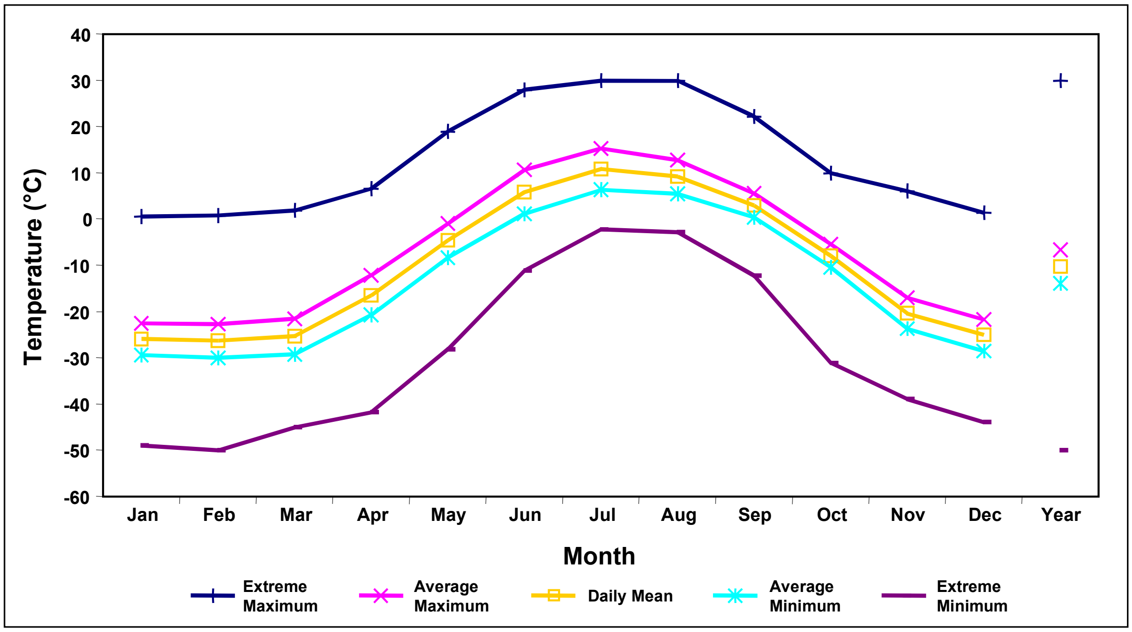

Figure 5-1: Expected Niglintgak Air Temperatures

5.2.3.3 Precipitation

The precipitation records for Tuktoyaktuk show a relatively dry climate with an average of less than 139.3 mm/a. The average yearly snow accumulation is 15 cm. Snow can occur every month of the year, with the smallest amounts in June, July and August. Although rare, extreme snow depths can approach 1 m.

Data indicates 33.5 days per year of poor visibility and 4.6 days per year of freezing rain and drizzle, both of which could affect aviation. The distribution of these observations indicates that up to six days per month could have reduced visibility, with May, June and July being the worst months.

Figure 5-2 shows the wind speed and relative duration according to its direction (known as the wind rose) for Tuktoyaktuk. The length of each directional band shows the percentage frequency from that direction. The width of the bands illustrates the wind speed distribution in that direction.

The Tuktoyaktuk wind rose indicates that wind distribution in two dominant directions can be expected at Niglintgak. Winds are a little stronger and more persistent from the east. However, winds from the northwest by west are also strong.

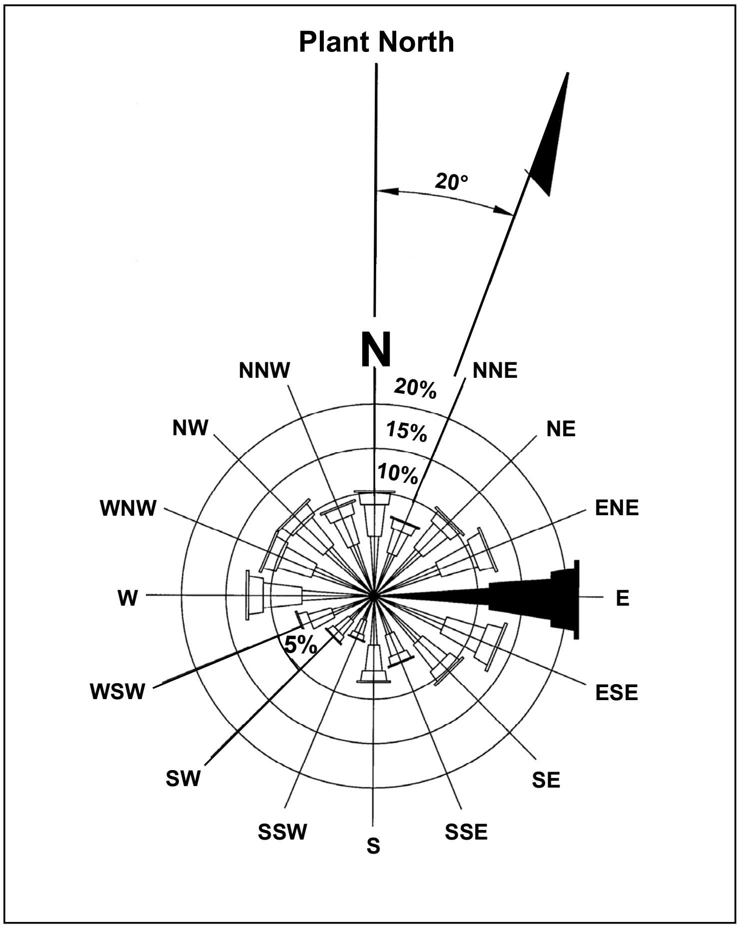

Figure 5-2: Tuktoyaktuk Wind Rose

5.2.4 HYDROLOGY

The Niglintgak development is located within the lower Mackenzie Delta. It covers:

- part of the Mackenzie River Middle Channel and Kumak Channel
- some smaller unnamed waterbodies
- parts of Richards Island and Niglintgak Island

The two main river hydrology features in the Niglintgak area are the:

- Middle Channel (downstream of Niglintgak Island), which is about 2 km wide and shallow (less than 2 m deep)

- Kumak Channel, which is about 500 m wide, up to 25 m deep, with measured flows of 5,380 m^3/s in June and 1,740 m^3/s in September

A minor channel, Aklak Channel, is located immediately downstream of the Middle and Kumak channels. It is about 50 m wide and up to 6 m deep. In 1975, the flow rate was measured at 57 m^3/s in June and 25 m^3/s in September.

5.2.4.1 Flooding and Ice Conditions

The main hydrological concern at the Niglintgak site is flooding during spring breakup and late summer storms. On the basis of data from 1976, typical flood levels in the Niglintgak area are estimated to be about 2.3 to 2.5 m above mean sea level. With ground elevations of about 1.5 m above mean sea level, these peak water levels have resulted in inundation depths of 0.8 to 1.0 m. On the basis of maximum driftwood elevations surveyed in the area, the maximum expected inundation depth is about 1.6 m.

Maximum flood levels at Niglintgak are reached during spring breakup and are expected to be 3 m above mean sea level. Typically, spring flooding lasts about one week before receding. Project facilities will be elevated to protect them from flooding.

Ice on river channels can range from about 1.1 to 1.8 m thick. The variability depends mainly on the depth of water and the amount of insulating snow cover on the channel. Spring breakup studies in the Niglintgak area were completed between June 1 and 7 in 1975 and 1976 and more recently in 2003 and 2004. These studies indicate that the mode of breakup in the Niglintgak area is different from that in the upstream parts of the Mackenzie Delta.

Middle Channel, downstream of its junction with Kumak Channel, is shallow, and its ice cover melts before the ice cover upstream. The floe ice is then able to move unrestricted past Niglintgak through Middle Channel. At Kumak Channel, the breakup of ice cover downstream of Niglintgak is believed to be dominated by thermal degradation.

5.2.4.2 Design Impact

Transporting the gas conditioning facility through the delta might require some dredging because of the shallow water depth in some areas. To reduce dredging requirements and optimize route selection, additional data will be collected during the summer of 2004, including:

- bathymetric data on the topography of the Kumak Channel riverbed to determine the amount of dredging that will be required to prepare the barge set-down site and finalize the barge location
- water level, depth and bathymetric data for both the Mackenzie River and Beaufort Sea required for finalizing barge transportation plans

5.2.5 HYDROGEOLOGY

Niglintgak is located in an area of intermediate discontinuous permafrost. The active permafrost layer at Niglintgak ranges from 0.25 to 1.3 m thick. However,

5.2.5 HYDROGEOLOGY (cont'd)

this layer is expected to become thinner farther away from the larger bodies of water and their associated areas of unfrozen permafrost (taliks). Taliks that extend completely through the permafrost (open taliks) are likely to occur beneath the larger lakes and river channels. Groundwater might be present within taliks.

5.2.6 TERRAIN

The Niglintgak gas field straddles the wide expanse of the Middle Channel of the Mackenzie River and Kumak Channel. This part of the Mackenzie Delta has distinctive fluvial characteristics, including:

- wetlands
- active river channels
- estuarine deposits

The landforms on the Mackenzie Delta are dynamic, thus are continually modified by their environment at different rates. For thousands of years, the shoreline and ice-rich landforms have responded to yearly, seasonal and daily climatic events, such as floods or storms.

Topographic information was obtained for the Niglintgak area through a LiDAR aerial survey completed in the summer of 2003. This survey provided detailed elevation information that was useful in evaluating different Niglintgak facility options.

The following key terrain features have affected Niglintgak development evaluations:

- The low, flat terrain found over most of Niglintgak Island and the nearby river banks requires both well pad and flow line designs to be further elevated and designed for flood and ice scour protection.

- The small island and associated depositional sandbar located on the east side of Kumak Channel provides additional protection for the grounded barge during spring breakup, and influenced the choice of the barge set-down location.

- The higher ground to the east of Kumak Channel is significantly above flood levels, making it a preferred location for the land-based processing facility alternative evaluated.

5.2.7 VEGETATION

The Niglintgak area is situated in the Tuktoyaktuk Coastal Plain Ecoregion of the Southern Arctic Ecozone, referred to as the Tundra Ecological zone. Abundant low shrubs, sedges and mosses characterize the tundra of the Tuktoyaktuk area.

Vegetation in the Niglintgak area grows on a thin veneer of unfrozen organic or granular substrate overlying the permafrost. Vegetation types include:

- dwarf shrub heath
- sedges
- cotton grasses
- sphagnum

5.3.1 SURFICIAL GEOLOGY AND GEOMORPHOLOGY

The Mackenzie Delta has undergone at least two periods of glaciation in the last 100,000 years. Before the glaciers formed, marine sediments were deposited, followed by sandy deposits of a large braided alluvial system.

Most of the landforms present are related to the last two major glacial events of the recent large Laurentide glaciation. The Laurentide ice approached the Inuvik area from the southeast and reached its maximum thickness 30,000 to 25,000 years ago.

Sediments deposited during this glacial event consisted of:

- sand and gravel, deposited in front of the advancing glacier
- till, deposited as the glacier retreated or melted
- sand and gravel, deposited by meltwater from the retreating glacier

5.3.1.1 Deposition Levels

The surficial geology of the area is dominated by nearly level deposits from the Mackenzie Delta with flat-topped hills, remnants of Pleistocene glacial deposits with elevations up to 30 m. Fluvial erosion and deposition is active, and mass movement related to slope or bank erosion is common. Ice-wedge polygons and pingos are common on low elevation landforms in the area.

5.3.1.2 Wetlands

The Niglintgak area is located within the Low Arctic Wetland Region where peatlands, or organic wetlands, are the dominant wetland type. These areas are saturated with water long enough to promote wetlands or aquatic processes. Indicators of wetlands include:

- poorly drained soils
- hydrophytic vegetation
- various kinds of biological activity that are adapted to a wet environment

5.3.1.3 Subsidence

Subsidence resulting from oil and gas withdrawal from reservoirs is the key geological environmental factor affecting the design criteria for the Niglintgak

5.3.1.3 Subsidence (cont'd)

development. Subsidence at the Niglintgak field will cover the production field area and occur gradually over the expected 25-year life of the reservoir. The subsidence will cause a dishing effect on the surface. The amount of subsidence will decrease uniformly with the distance from the centre of the reservoir.

Subsidence for the proposed Niglintgak development is expected to be about 45 cm at the centre of the reservoir, decreasing to about 10 cm at the gas conditioning facility location. Conceptual evaluations concluded that the differential settlement caused by subsidence:

- will have only a negligible effect on the infrastructure
- will not affect the integrity of the structures, wells, pipeline or facilities
- will not have a significant environmental impact

Where structures need to be elevated above the surface of the tundra to remain above high-water levels, the expected subsidence will be taken into account when determining the facility elevation.

The extent of subsidence monitoring required will be investigated as engineering design progresses.

5.3.1.4 Seismic Activity

Active faulting in the Niglintgak area terminated in the late Miocene (about five million years ago). No mapped faults reach the surface in the Niglintgak area. For further information on the area tectonism, see Section 2.1, Geological Description. Although no major faulting is currently occurring in the region, minor displacements in the bedrock might occur, which can induce detectable seismic activity. Since detailed record keeping started in 1954, no earthquake greater than four on the Richter scale has been recorded within 100 km of Niglintgak. This is barely strong enough to be felt at the epicentre and would not cause any damage to property.

The production of gas from the Niglintgak field may cause small-scale slip along subsurface faults. Typically, the primary trigger for production-induced seismic activity is injection of large volumes of water. Although a water disposal well is part of the proposed Niglintgak development, the volume of liquids to be injected is too small to have any significant impact.

Seismic hazard ratings across Canada are divided into seven seismic zones (zero to six) for both maximum ground acceleration and maximum horizontal ground velocity. Higher zoning represents increased seismic risk. The general Niglintgak area is considered to be within Seismic Zone 1 for both acceleration and velocity. The Niglintgak design will include consideration for earthquakes up to 0.08 g in the design.

5.3.2 IMPACTS ON DESIGN

5.3.2.1 Gas Conditioning Facility

The Niglintgak gas conditioning facility will be located on a steel substructure that will be secured to the Kumak Channel riverbed. A technical feasibility evaluation was done to determine the most appropriate design and placement method, considering the geotechnical features at Niglintgak. This included a geotechnical analysis, which concluded that the riverbed could support the required load. Additional geotechnical data will be gathered to:

- confirm the final gas conditioning facility set-down location
- provide design data for foundation design

5.3.2.2 Permafrost

Most of the Inuvialuit Settlement Region is classified as a continuous permafrost zone, with permafrost depths of up to 600 m. The active Mackenzie Delta, including the Niglintgak production area, has been classified as a zone of intermediate discontinuous permafrost because of the impact of waterbodies on permafrost formation.

Permafrost in the Niglintgak area primarily affects foundation and flow line design. Well pad foundations will be elevated for permafrost and flood protection, using an elevated pile design (see Section 7.5, Civil and Infrastructure Facilities, for additional details).

Options considered for flow line design required additional analysis of the permafrost impact and protection. A buried, insulated, warm flow line was one of the concepts evaluated in the early design work. Because of permafrost protection concerns and other criteria considerations, the buried option was replaced by the proposed elevated flow line design. The proposed flow lines will be placed on steel piles drilled and frozen in place.

5.4.1 FLOW STREAMS AND DESIGN RATES

5.4.1.1 Flow Rates

The Niglintgak gas production profile has been developed to maximize resource recovery and economic return from the field. The estimated production rate used for the Niglintgak field is 4.3 Mm^3/d (150 MMscf/d) raw gas with a flat life production period of 13 years, from 2010 to 2023. From 2024, production is expected to decline until a reservoir abandonment pressure of 1,724 kPa is reached.

The current production forecast is based on a daily production rate of 4.3 Mm^3/d (150 MMscf/d). However, the final design flow rate of the production facilities might be up to 5.7 Mm^3/d (200 MMscf/d) to accommodate scheduled maintenance, production downtime and additional gas sales opportunities. The environmental impact assessment of the processing facilities was based on a nominal design of 5.665 Mm^3/d (200 MMscf/d), and demonstrated that no significant impacts are likely at this rate. Shell requests that the capacity of the processing facility only be limited by the assessment emissions levels.

5.4.1.2 Availability

During the conceptual design phase of the development, a reliability and maintenance (RAM) study was done to predict the availability of the Niglintgak facilities. The evaluation concluded that availability of about 78% would be achievable in the first year of operations, rising to 97% in the next three years of field life. Toward the end of field life, availability is expected to drop further to 93%, because of higher maintenance requirements.

Availability impacts, liquids shrinkage and fuel gas use reduce the daily natural gas production rate of 4.3 Mm^3/d (150 MMscf/d) to an average annual sales gas production rate of about 3.7 Mm^3/d (130 MMscf/d), at the Northwest Territories–Alberta boundary.

Table 5-1 summarizes the production forecast, including the impact of availability and sales gas production.

Table 5-1: Niglintgak Gas Production Forecast

Average Annual Gas Rate (Mm^3/d)			
Year	Field Raw Gas Production	North Alberta Boundary Sales Gas	Condensate (m^3/d)
2010	3.2	3.0	5.9
2011	4.0	3.7	7.4
2012	4.0	3.7	7.4
2013	4.0	3.7	7.2
2014	4.0	3.7	7.2
2015	4.0	3.7	7.1
2016	4.0	3.7	7.1
2017	4.0	3.7	7.1
2018	4.0	3.7	7.1
2019	4.0	3.7	7.1
2020	4.0	3.7	7.1
2021	4.0	3.7	7.1
2022	3.9	3.6	7.1
2023	3.9	3.6	7.1
2024	3.9	3.6	6.0
2025	3.4	3.2	0.0
2026	2.9	2.7	0.0
2027	2.4	2.2	0.0
2028	1.8	1.7	0.0
2029	1.3	1.2	0.0
2030	1.1	1.0	0.0
2031	0.8	0.7	0.0
2032	0.7	0.7	0.0
2033	0.7	0.6	0.0

5.4.1.3 Hydrocarbon Liquids Design Flow Rate

Well P-4L will produce a richer gas from the deep L, M and N reservoirs. All the other Niglintgak wells are expected to produce lean, sweet gas, with little to no hydrocarbon liquids, from the shallow A sand reservoirs. The overall blended gas composition is lean (98% methane) with the liquid-rich gas expected to make up less than 5% of the total flow from the field.

Any heavier components from the P-4L well can be absorbed into the leaner A sand gas. As a result, no liquid hydrocarbon dropout is expected in the Niglintgak gas conditioning facility under steady-state conditions. However, at the Inuvik gas conditioning facility, some liquid hydrocarbon will be extracted from the Niglintgak field product, at a low rate of about 6 m^3/d (40 bbl/d).

5.4.1.4 Produced Water Design Flow Rate

Water production is expected toward the middle of field life, when gradual water encroachment is expected in three or four of the wells. Water production timing and volumes will depend on the strength of aquifer support, the well positions, and the characteristics of the producing reservoir over time. Wells to the south of the field will be more susceptible to water production than those to the north. The production strategy will be to selectively isolate water-producing zones in the wells once water breakthrough is detected.

The conceptual design is currently based on an expected maximum water production rate of 32 m^3/d (200 bbl/d). The facilities design has been evaluated with higher water flow rates to understand how the process could handle different subsurface performance or production from other fields. About 159 m^3/d (1,000 bbl/d) of water could be handled in the flow lines, with some modifications required at the gas conditioning facility. Higher flow rates could require significant system redesign. This design will be optimized during the ongoing engineering evaluations.

5.4.1.5 Pressure

The initial flowing tubing head pressure for wells is expected to be about 9,650 kPa, except for the deep P-4L well, which is expected to be about 15,450 kPa.

The delivery pressure required for the gathering system at Niglintgak varies from 11,900 kPa in the summer to 12,600 kPa in the winter, as a result of the effect of ambient temperature on the gathering pipelines and equipment. To achieve these pressures at the Niglintgak facility outlet, gas compression will be required throughout the life of the field.

5.4.2 FLUID PROPERTIES

5.4.2.1 Hydrocarbon Composition

Niglintgak gas is lean (98% methane) and sweet, with less than 1% carbon dioxide and no hydrogen sulphide content expected (see Table 5-2). This blended gas composition is based on gas analyses completed during Niglintgak exploration in the 1970s and recombined in proportion to current well production forecasts.

5.4.2.2 Waxes, Asphaltenes and Emulsions

Waxes and asphaltenes are not expected to be of concern at Niglintgak. A wax appearance temperature study, done as part of the conceptual design, concluded that no wax is expected in the Niglintgak fluids.

The potential of the Niglintgak fluids to form emulsions with water, and any chemicals that might be required to inhibit corrosion or hydrates, will be studied during detailed design.

Table 5-2: Niglintgak Expected Blended Gas Composition

Component	Symbol	Mole Fraction
Nitrogen	N_2	0.0012
Carbon dioxide	CO_2	0.0090
Hydrogen sulphide	H_2S	0.0000
Methane	C_1	0.9819
Ethane	C_2	0.0069
Propane	C_3	0.0002
Isobutane	IC_4	0.0002
Normal butane	C_4	0.0001
Isopentane	IC_5	0.0000
Normal pentane	C_5	0.0000
Hexane	C_6	0.0000
Toluene	C_6	0.0001
Normal heptane	C_7	0.0001
Normal octane	C_8	0.0001
Note: Composition assumes a ratio of 20:1 A sand to L, M, N sand gas.		

5.4.2.3 Produced Water

Initially, only saturation water is expected to be produced from the Niglintgak wells. In time, free water production is expected as water encroaches in some wells. On the basis of well tests done in the 1970s, total dissolved solids (TDS) in the Niglintgak produced water are expected to be about 11,000 mg/L. These predicted TDS levels have been confirmed by:

- petrophysical analysis of the Niglintgak field
- comparison with the regional water chemistry map
- comparison with other anchor field produced water composition

5.4.2.4 Sand

The Niglintgak reservoir is in shallow, poorly consolidated rock, about 700 to 1,000 m below surface. Because of the reservoir's geological setting, the development wells are expected to produce sand and fines. The baseline sand production rate for the Niglintgak facility design, using downhole sand control completions, is 0.8 to 3.2 kg/Mm^3. Transient production rates from individual wells could be up to 16 kg/Mm^3 for periods of up to six months.

The production strategy will be to use sand screens to selectively control or shut off sand-producing zones in the wellbore, to reduce the requirements for handling sand production in surface facilities.

5.4.2.5 Naturally Occurring Radioactive Material

No naturally occurring radioactive material (NORM) is expected in the Niglintgak fluids, based on the expected conditions of the Niglintgak field.

5.4.3 PRODUCT SPECIFICATIONS

The Niglintgak gas conditioning facilities will process Niglintgak gas to meet the gathering pipeline requirements for pressure, temperature, water content and composition (see Table 5-3).

Table 5-3: Gathering Pipeline Specifications

Parameter	Value
Maximum water content (vapour)	6.0 mg/m^3
Maximum water content (NGLs)	10 ppmw
Hydrogen sulphide	3 mg/m^3
Maximum total sulphur	0.5% by weight
Maximum oxygen	0.4% by volume
Delivery pressure	12,600 kPa
Delivery inlet temperature	-1°C