NORTHWEST TERRITORIES WATER BOARD

ONSHORE OIL AND GAS EXPLORATION DRILLING QUESTIONNAIRE

FOR

WATER LICENCE APPLICATIONS

Prepared by:
Department of Indian Affairs and Northern Development
Water Resources Division
August 1999
Version 5.07
Introduction

The purpose of this questionnaire is to solicit supplemental information from an applicant to support their application for a water licence (or renewal). It is anticipated that the completion of this questionnaire will reduce delays arising from the Northwest Territories Water Board having to solicit additional information after an application has already been submitted. This information will also be useful during the environmental assessment and screening of your application, which must be undertaken prior to development and approval of a water licence.

The applicant should complete the questionnaire to the best of his/her ability, recognizing that some questions may not be relevant to the project under consideration. For questions that do not relate to his/her operation, the applicant is requested to indicate “N/A” (Not Applicable).

If any questions arise while completing the questionnaire, the applicant may wish to contact the Northwest Territories Water Board at (867) 669-2772. If your question is that of a technical nature please contact the Regulatory Approvals Section of the Water Resources Division, Department of Indian Affairs and Northern Development (INAC), at (867) 669-2651.

Chairman,
Northwest Territories Water Board
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If space is insufficient for any of the responses on this questionnaire, use the back of the sheet or attachments.

List attachments in Appendix 1.

Print or type your responses.
SECTION 1:
PRELIMINARY SITE ASSESSMENT

DATE: July 16, 2002

1.1 APPLICANT

COMPANY NAME: Chevron Canada Resources

ADDRESS: 500-5th Avenue SW
Calgary AB
T2P 0L7

PROPERTY NAME/EXPLORATION LIC. #: EL 394

CLOSEST COMMUNITY: Tuktoyaktuk

LATITUDE/LONGITUDE OF WELL CENTRE (Degrees, minutes, seconds):
Langley E-30 69° 19' 8.03” N, 135° 36' 39.15” W
Langley D-30 69° 18' 45.29” N, 135° 36' 51.29” W
Only one of the two drill locations noted above will be drilled.

1.2 PRIMARY COMPANY CONTACT:

NAME: Delona K. Butcher -

TITLE: Land Representative

CONTACT NUMBER: 403-234-5393

ALTERNATE CONTACT NUMBERS: Cynthia Pyć, Environmental Specialist
403-234-5241

1.3 FIELD CONTACT:

NAME (If known):

TITLE (If known):

CONTACT NUMBER:

1.4 INDICATE THE STATUS OF THIS APPLICATION:

NEW APPLICATION ☒ RENEWAL ☐

IF RENEWAL, INCLUDE LICENCE NUMBER:
1.5 SITE HISTORY

INDICATE IF THIS SITE CONTAINS ANY KNOWN:

FORMER WELL SITES    No
WASTE DUMPS          No
FUEL AND CHEMICAL STORAGE AREAS  No
SUMP AREAS           No
WASTE WATER DISCHARGE LOCATIONS No

DESCRIBE SITES AND REFERENCE THEM ON THE MAP IN QUESTION 1.6

1.6 ATTACH MAPS DRAWN TO SCALE SHOWING LOCATIONS OF EXISTING AND PROPOSED:

CAMP FACILITIES,
WELL SITE(S),
SUMPS,
WATER SOURCES,
FUEL AND CHEMICAL STORAGE FACILITIES,
DRILLING MUD STORAGE FACILITIES,
DRAINAGE CONTROLS,
TRANSPORTATION ROUTES (SEASONAL AND ALL WEATHER)*,
ELEVATION CONTOURS,
LOCATIONS OF WATERBODIES
DRAINAGE PATTERNS FOR WELL AND CAMP SITES.

1.7 DESCRIBE THE PROPOSED OR CURRENT METHOD OF FRESHWATER WITHDRAWAL, THE TYPE AND OPERATING CAPACITY OF THE PUMPS USED AND THE INTAKE SCREEN SIZE.

For drilling and camp purposes, water will be withdrawn from a channel of the Mackenzie River (please see the drawings in the map pocket of the attached project description). Alternatively, water may also be drawn from the Middle Channel. Intake hoses will be equipped with screens in compliance with DFO Freshwater Intake End of Pipe Fish Screen Guideline (1995) to prevent the impingement or entrapment of fish. The suction foot will be suspended in the water column to avoid disturbance of the river bottom.

The type and capacity of the pumps will be determined when service contracts are awarded. Chevron will advise regulators when this information becomes available.
1.8 ESTIMATE MAXIMUM DRAW DOWN AND RECHARGE CAPABILITY OF THE RIVER OR LAKE FROM WHICH FRESH WATER WILL BE DRAWN. QUOTE DRAW DOWN IN CENTIMETRES, OR, STATE PERCENTAGE OF FLOW WITHDRAWN.

DRILLING AND CAMP WATER REQUIREMENTS

<table>
<thead>
<tr>
<th>Activity</th>
<th>Max. Volume (m³/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access and Well Site Construction</td>
<td>-700</td>
</tr>
<tr>
<td>Drilling and Camp</td>
<td>-250</td>
</tr>
</tbody>
</table>

During construction of the overland access and lease areas, average water usage should be 500 m³/day, but may be as high as 700 m³/day for a very short period (i.e., 5-7 days). Construction is expected to be complete by late February. Drilling and completions operations water requirements are expected to be 250 m³/day maximum. However, average daily requirements are expected to be significantly less. For a calculation of percentage of daily discharge, please see the attached paper Calculation of Percentage of Daily Discharge.

1.9 INDICATE IF PERMAFROST IS EXPECTED TO BE ENCOUNTERED UNDER:

- CAMP FACILITIES: Yes
- WELL SITE: Yes
- ACCESS ROUTES: Yes
- SUMPS: Yes
- OTHER: 

1.10 INDICATE ANY POTENTIAL FOR ENCOUNTERING ARTESIAN AQUIFERS OR LOST CIRCULATION WITHIN THE SURFACE HOLE (TO CASING DEPTH)

N/A
1.11 ATTACH A DESCRIPTION OF THE SURFICIAL GEOLOGIC AND HYDROGEOLOGIC CONDITIONS IN THE IMMEDIATE VICINITY OF THE WELLSITE

The proposed program is located in the Tuktoyaktuk Coastal Plain Ecoregion of the Southern Arctic Ecoregion. The landscape surrounding the proposed program consists of low-lying (2-3 m asl) deltaic sediments incised by a network of meandering channels. The region is underlain by continuous permafrost.

The surficial geology of the outer Mackenzie Delta consists of Holocene deltaic and floodplain sediments from the modern surface of the Mackenzie Delta, typically composed of interbedded silts and silty sands, and often ice-rich in the upper 30 m. The hydrocarbon-bearing sequence of the outer Mackenzie Delta has been identified as an upper layer of weakly consolidated sandstone and conglomerate, and includes the uppermost Quaternary sediments of the area. Underlying this is a layer of primarily fine-grained siltstone and shale.

The area lies in the zone of tidal, marine and fluvial influence. Water levels in the channels are influenced by tides and sea storm surges, and fluvial inflow, including spring flooding.

The major channels of the delta appear largely unchanged in the last century, with the Middle, East, and West channels primarily controlling the hydrologic regime of the delta lakes (MRBC 1981). The development of vegetated, fine-grained levees and the presence of perennially frozen ground limit the lateral migration of delta channels (Graf Pannatier 1998).

For more information please refer to Section 11.1, Physiography and Bedrock Geology (page 28) and Section 11.5, Hydrology (page 29)

SECTION 2:
WATER USE AND WASTE DISPOSAL

2.1 OUTLINE ALL WATER USAGE IN THE DRILL PROGRAM, CAMP FACILITIES, AND ROAD CONSTRUCTION. INDICATE THE SOURCE AND VOLUME OF WATER FOR EACH USE.

<table>
<thead>
<tr>
<th>Source</th>
<th>Use</th>
<th>Average Volume (m³/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Channels of the Mackenzie River</td>
<td>Wellsite Access Construction</td>
<td>500-700</td>
</tr>
<tr>
<td>2. Channels of the Mackenzie River</td>
<td>Drilling and Camp</td>
<td>250</td>
</tr>
</tbody>
</table>

TOTAL: 250-700 m³/day

2.2 WILL DRILLING WASTES CONTAIN DETRIMENTAL SUBSTANCES INCLUDING, BUT NOT LIMITED TO, OIL BASED OR INVERT MUDS AND HIGH SALINITY FLUIDS?

YES [ ] NO [X]

IF YES, INDICATE SUBSTANCES:
Chevron proposes to drill the North Langley well to a depth of approximately 1600 - 2000 m using a water-based KCl-polymer fluid system. This formula is a combination of potassium chloride (KCl) polymer and bentonite.

Please refer to Appendix C, Products to Be Stored On-Site, for a complete list of products.
2.3 **INDICATE THE TOTAL ESTIMATED VOLUME OF DRILLING WASTES**

Approximately 1, 000 m$^3$ of drilled solids and liquid effluent will be generated.

2.4 **INDICATE METHODS FOR DISPOSAL OF DRILLING WASTES.**

- [x] SUMP
- ______ DOWN HOLE (REQUIRES NEB APPROVAL)
- ______ ON-SITE TREATMENT (PROVIDE PLAN)
- ______ OFF-SITE (GIVE LOCATION AND METHOD OF DISPOSAL)

2.5 **IF A SUMP IS BEING USED, ATTACH THE FOLLOWING INFORMATION**

- SCALE DRAWINGS AND DESIGN OF SUMPS,
- CAPACITY IN CUBIC METRES,
- BERM EROSION PROTECTION,
- SOIL PERMEABILITY AND TYPE
- RECYCLING/RECLAIMING WATERS,
- SURFACE DRAINAGE CONTROLS,
- ABANDONMENT PROCEDURES.

2.6 **WILL A CAMP BE PROVIDED?**

- YES [x]
- NO [ ]

2.7 **IF YES, THEN INDICATE THE CAPACITY AND THE EXPECTED MAXIMUM NUMBER OF PERSONS THAT WILL BE ACCOMMODATED.**

- **CAPACITY** 74 PERSONS
- **MAXIMUM ACCOMMODATED** 62* PERSONS

* The camp has 62 beds with capacity for 12 overflow beds for emergency use.
SECTION 3:
CONTINGENCY, ABANDONMENT AND RESTORATION PLANNING

3.1 ATTACH THE PROPOSED OR EXISTING CONTINGENCY PLAN WHICH DESCRIBES COURSE OF ACTION, MITIGATIVE MEASURES AND EQUIPMENT AVAILABLE FOR USE IN THE EVENT OF SYSTEM FAILURES AND SPILLS OF HAZARDOUS MATERIALS (IN COMPLIANCE WITH NWT WATER BOARD GUIDELINES FOR CONTINGENCY PLANNING, 1987).
Please refer to the attached Emergency Response Plan.

3.2 ATTACH AN INVENTORY OF HAZARDOUS MATERIALS ON THE PROPERTY (AS DEFINED UNDER TRANSPORTATION OF DANGEROUS GOOD REGULATIONS).
Please refer to Appendix C, Products to be Stored On-Site in the attached project description.

3.3 ATTACH AN OUTLINE OF PLANNED ABANDONMENT AND RESTORATION PROCEDURES.
Upon completion of the drilling program, the wells will be capped and temporarily or permanently abandoned, and the wellsite, camp site, and fuel storage facilities will have the surface scraped to pick up all contaminated or stained ice and snow. This scraped material will be trucked to an approved disposal site (Section 4.4.2, page 15, of the attached project description). All equipment, survey stakes and construction debris associated with the operations will be disposed of upon completion of drilling. The sump will be backfilled, reclaimed and monitored as described in Section 4.3.6 and 4.3.7 (pages 11-14) of the attached project description. After the snow and ice pad has melted, the site will be revisited to ensure no garbage or debris has been left on the site. Although not anticipated beyond the sump location, any surface disturbance will be remediated in consultation with the INAC Inspector.

The success of the well will dictate whether the well bore is suspended for future production or permanently abandoned. If successful, the well will be suspended and a wellhead will be installed above ground. The planned wellhead will be appropriately marked and protected. The suspension or abandonment will be performed as per NEB regulations.

At the completion of Chevron's operations, the sump contents will be at least 1 m below the active zone. The spoil pile will be removed from the ice pad and used to backfill the sump. By using an ice pad, inadvertent surface damage will be avoided during the backfill operation. The backfill cover over the sump will provide 3 - 4 m of overlap on all sides to prevent migration due to runoff or rain entering the excavation area. The top layers will then be replaced, in the order in which they were removed, on the sump surface in an irregular shape. Carefully stripping, separating and replacing the top soil layers, in order, will facilitate natural revegetation of the site.

Chevron is a participant on the Environmental Studies Research Fund (ESRF) Technical Advisory Group, which is examining best practices related to sump construction. Chevron will comply with the recommendations of the group, as they are developed.
SECTION 4:

ENVIRONMENTAL ASSESSMENT AND SCREENING

Your application and other project details, such as this questionnaire, will be sent out for review by local aboriginal and public groups as well as territorial and federal government agencies. Their comments regarding the significance of project impacts are considered before a decision is made to allow the project to proceed. Because formal assessment and screening of water licences was only initiated in about 1989, applicants will find that this process may be required even if the project has been built and in operation for several years. However, if your project has been previously screened a further assessment may not be required, or a more limited process may be used. This will depend on individual circumstances, including the stage of the project. Some projects may need a higher level of review or submission of more information before being screened.

4.1 HAS THIS PROJECT EVER UNDERGONE AN INITIAL ENVIRONMENTAL ASSESSMENT, INCLUDING PREVIOUS OWNERS?

YES □ NO ☒

IF YES, BY WHOM / WHEN: ________________________

4.2 HAS BASELINE DATA BEEN COLLECTED FOR THE MAIN WATER BODIES IN THE AREA?

YES □ NO ☒

IF YES, ATTACH DATA.

4.3 HAS BASELINE DATA BEEN COLLECTED AND EVALUATED WITH RESPECT TO THE BIOPHYSICAL COMPONENTS OF THE ENVIRONMENT POTENTIALLY AFFECTED BY THE PROJECT (WILDLIFE, SOILS, AIR QUALITY).

YES ☒ NO □

IF YES, ATTACH DATA.

Please refer to Section 11.0 Environmental Overview (pages 28-41) in the attached project description.

4.4 ATTACH A DESCRIPTION OF ALL PROPOSED AND EXISTING ENVIRONMENTAL MONITORING PROGRAMS.

Testing of the drilling waste will occur at regular intervals during operations to ensure the contents meet regulatory guidelines. All wastes deposited in the sump will be compatible with these guidelines.

An Environmental Monitor contractor will document the condition of the sump to provide a benchmark for any future evaluation. The sump will also be monitored for salinity migration using electromagnetic induction, post-operations in April and again the following year. Electromagnetic induction measures conductivity of the soils to determine whether the salts in the drilling wastes are migrating through the soil from the sump.

A qualified Inuvialuit Environmental Monitor and an Inuvialuit Wildlife monitor will be employed during the construction phase of operations to monitor operations and ensure that mitigative measures are implemented and environmental and wildlife concerns are addressed as they are encountered. The Environmental Monitor will have
appropriate training, experience, and knowledge of the local area to successfully fill this role. It is important that the roles and responsibilities of the Monitor be clearly understood by all crew members. The Environmental Monitor will prioritize her/his activities according to which tasks may have a higher potential to cause adverse environmental impact. It will also be the Environmental Monitor's responsibility to document relevant information for ILA, INAC and Chevron.

An Inuvialuit Wildlife Monitor will be employed for the duration of the program to mitigate impacts to wildlife in the vicinity of the program and to handle interactions between wildlife and crews or equipment. The Wildlife Monitor will have knowledge of the local area and experience handling firearms. The Wildlife Monitor should attend daily meetings and should communicate wildlife sightings or environmental concerns to the Environmental Monitor.

4.5 HAS A COMMUNITY CONSULTATION PROGRAM BEEN INITIATED?

YES ☒ NO ☐

IF YES, PROVIDE DETAILS OF THE PROGRAM.

Please refer to Section 16.0 Community Consultation (pages 64-73) in the attached project description.