



Sahtu Land and Water Board

Staff Report

Division: Land Program – Water Program	Report No. 1
Date Prepared: July 17, 2013	File No. S13A-002 / S13L1-005
Meeting Date: July 19, 2013	
Subject: Type A Land Use Permit and Type B Water Licence Applications submitted by Husky Oil Operations Ltd.	

1. Purpose/Report Summary

To inform the Board about a Type A Land Use Permit (LUP) and Type B Water Licence (WL) application by Husky Oil Operations Limited (Husky) for drilling, completion and flow testing of two wells; Little Bear O-41 and G-70 on Exploration Licence (EL) 463, approximately 40 km south-southeast of the Town of Norman Wells, NT.

2. Background

2.1 Project Overview

For the fall of 2013, Husky plans to drill, complete, and flow test two wells to further validate and evaluate the Canol, Hare Indian and Bluefish Shales within EL 463. The program includes one vertical hydraulic fracture stimulation for each well, with a contingency plan of one additional fracture stimulation if required. In support of the drilling program, Husky has already obtained a Land Use Permit and Water Licence for the access, a staging area, and camp operations.

The proposed drilling locations are located at the following coordinates:

Little Bear O-41 (65.014770⁰N 126.389651⁰W)
Little Bear G-70 (64.991234⁰N 126.453664⁰W)

In order to allow for improved efficiency and overall reporting to the Sahtu Land and Water Board (SLWB) and Aboriginal Affairs and Northern Development Canada (AANDC), to help reviewers understand the overall operations being proposed, and to help assess the overall cumulative impacts this operation can/will have in this area, Husky proposes to:

- Consolidate LUP S11A-003 (as amended), along with the LUPs Terms and Conditions outlined into the LUP for this proposed program.
- Consolidate WL S11L1-003, along with the WLs Terms and Conditions outlined into the WL for this proposed program.

The program consists of the following components:

- The drilling project will be conducted wholly within EL 463 on Crown and Sahtu Land;

- Use of the all-weather road to the wellsite access points;
- Construction of all-weather access to the two wellsites;
- Culverts will be installed as construction progresses;
- Mobilization of one drilling rig and support equipment to the wellsites;
- Drilling of a well at O-41 to a depth of approximately 1,150m;
- Drilling of a well at G-70 to a depth of 3,000m;
- Reservoir evaluation utilizing the drilling rig, including the collection of rock cores and down hole geophysical logs, open-hole formation testing;
- Demobilization of equipment;
- Mobilization of completion and testing equipment to the wellsites;
- Diagnostic Fracture Injection Tests (DFIT);
- Completion, reservoir stimulation (by vertical hydraulic fracturing) and flow testing at the two wellsites;
- Flow induction and swabbing of the stimulated formations to recover completion fluids, reservoir fluids (natural gas, oil and/or condensate), and to determine flow rates;
- Incineration of produced natural gas and natural gas liquids;
- Collection of produced fluids into on-site storage tanks;
- Suspension of both wells upon completion of flow testing;
- Waste management, including the trucking or storage and barging of liquid and solid wastes off-site;
- Disposal of produced and make-up fluids at an approved disposal facility or to an oil and gas operator; and,
- Demobilization of equipment.

Access and Lease Construction

All-weather access will be constructed for both well locations. Clearing will take place by bulldozing, mulching or hand cutting. Following clearing, geotextile will be laid down and the access and wellsite pads will be constructed by the placement of approximately 1m of fill obtained from one of the quarries.

Access to the O-41 wellsite will utilize the existing airstrip access road. Approximately 1km of new access (20m right-of-way) will be constructed along the airstrip. A 130m by 200m all-weather pad will be constructed. It is anticipated that 38,000m³ of fill will be required for the wellsite and access road construction. The proposed wellsite dimensions are larger than a typical lease, as the area has been expanded to accommodate an offset of 127m from the airport to meet rig mast clearance requirements for aviation operations. After operations, this addition lease area will be used in the future as a storage/warehouse site.

Access to the G-70 wellsite will be from the all-weather road. It will be approximately 1.4km long and 20m wide. A 110m by 150m all-weather pad will be constructed. It is anticipated that 42,000m³ of fill will be required for the wellsite and access road construction.

Crew Accommodations

The crews will be lodged in at the base camp that has been permitted under Land Use Permit S12F-007 and Water Licence S11L3-002. At this time, a maximum allowable person's onsite is 100. Husky has agreed to not exceed 100 persons in camp until they have received SLWB approval to expand the size of this camp.

Water Supply and Usage

Water is required for drilling and completion activities. The total requested water volume is 4,000m³.

The anticipated water budget by source is as follows:

Activity	Estimated Volume	Source
Drilling - O-41	1000m ³	Mackenzie River
Completion - O-41	1000m ³	
Drilling – G-70	1000m ³	
Completion – G-70	1000m ³	
Total	4000m³	

Vertical Hydraulic Fracturing

Both wells will be completed using a hydraulic fracture stimulation technique. In the O-41 well, the target formation is approximately 950m below the surface and in the G-70 well, it is approximately 1,350m below the surface into the upper section of the Canol Formation. From an understanding of the rock properties encountered in similar rock formations, engineers have estimated the fracture pattern induced will extend up to 40m vertically and 80m laterally into the formation.

The length and rate of production are measured over a period of days, and this information is used to estimate the productivity of the well. Any gas volumes recovered will be measured, and then incinerated for complete combustion of all hydrocarbon products. There will be no horizontal fracturing. Production testing equipment, including incinerators, will be on-site as required by the NEB to control any natural gas releases.

If results of the flow back are unsatisfactory, the contingency plan is to conduct one additional fracture stimulation, at either of the wells, if required. The target location is anticipated to be ±930m and ±1360m on O-41 or G-70 respectively.

See attachment for a summary of potential drilling fluids.

Fuel and Drilling Fluid Storage:

Diesel fuel will be transported to the drilling locations, for the drilling program (including construction, rigs and camps) from the fuel tank farm at the camp/storage site on an as-needed basis (although a base level of on-site storage will be required to ensure an uninterrupted supply). Fuel storage will remain on the wellsite during drilling, completion and testing operations. During drilling, completion and testing operations, fluid storage at the wellsite will be contained in single-walled tanks, located within a portable lined dike, with sufficient volume to contain 110% of the total volume of the largest tank in the dike.

Diesel fuel, propane and drilling/completion fluids will be stored on site as follows:

Diesel	1 (15m ³) double-walled tank, bermed to 110% capacity
Propane	2 (45 Kg)
	8 (400 L)
	1 (300 L)
Drilling Fluids:	

Mineral oil-based drilling fluids	5 (63.6 m ³)
Mineral oil	1 (63.6 m ³)
Fresh water	1 (63.6 m ³)
Completions & Testing:	
Clean Fluid for DFIT & Frac	5 (63.6 m ³)
Clean Hole Volume	2 (63.6 m ³)
Fire Water	1 (63.6 m ³)
Kill Fluid	1 (63.6 m ³)
Methanol	1 (63.6 m ³)
Acid	1 (63.6 m ³)
Dirty Hole Volume	2 (63.6 m ³)
Frac Flow Back & Produced Fluid (51%)	4 (63.6 m ³)

Spill response equipment will be located throughout the program area including dedicated spill kits located near the fuel tanks. Additional spill response materials will be stored at the staging site and the wellsites. In addition, spill response equipment will be maintained on all fuel transfer vehicles.

Waste Management Plan

Drilling waste for both wells is anticipated to consist of fluids and cuttings associated with both freshwater-based gel-slurry and mineral oil-based and cement. All freshwater drilling residual solids and fluids (consisting primarily of freshwater and bentonite) will be stored in tanks or in a lined metal or synthetic plastic-sided berm containment system. Following toxicity testing, the solids and fluids maybe transferred to bermed storage pits in the quarry. A controlled discharge of any separated waters to adjacent lands and incorporating any solids into quarried material to be used on road and pad construction is being proposed. If analysis show that the waste streams are contaminated, the waste streams will be loaded and hauled away to an approved facility.

Solid waste from the mineral oil-based drilling fluid systems will be centrifuged and transferred to a storage tank where it will be mixed with sawdust or a solidifier to stabilize the waste for transport. All solid mineral oil drilling waste will then be transported under a Movement Document by truck or barge, to a Class II Landfill. Recovered mineral oil fluid will be returned to the double-walled storage tanks for re-use.

Cement returns will be solidified into rings and once set, it will become inert. This material will be analyzed, and if acceptable, will be crushed and incorporated into quarried material to be used on road and pad construction. If the cement returns do not set, they will be incorporated into the mineral oil-based drill cuttings and hauled to an approved disposal facility.

For the completions and testing, recovered hydrocarbons or waste water will be returned to the double-walled storage or floc tanks on site. All solid and fluid waste will then be transported by truck or barge to various approved Oilfield Waste Facilities. If the product is considered useable (e.g. produced oil), it will be transported to an appropriate oilfield or operator facility. No completions waste will remain on site at the end of operations.

Areas of the wellsite dedicated to waste handling will be protected with a synthetic liner to contain any spills associated with transferring, mixing, and loading. The liner integrity (preventing rips, punctures, and tears) will be protected by rig mats.

Emergency Response and Spill Contingency Planning

Husky has developed an Emergency Response and a Spill Contingency Plan that will be adhered to throughout the course of the Project. All spills will be reported to the NT-NU 24-hour Spill Report Line and, regardless of volume, will be documented and reports submitted to the AANDC Land Use Inspector upon request.

Equipment Demobilization and Clean-up

Lease and access clean-up will take place once the service rig has moved out and will include:

- the removal of any remaining trash and debris;
- cleanup of any spills on site;
- removal of liners; and
- installation of appropriate signage at well centre.

Husky intends to suspend the wells following the completion and testing program. The wells may be re-entered at a future date. Prior to the end of the EL term and the expiry of the LUP, the following abandonment activities will take place:

- all remaining debris will be removed;
- well casings will be cut and capped to one metre below ground level;
- cellar culverts will be removed;
- well centre will be backfilled;
- all spills will be scraped up;
- appropriate signage will be placed at well centre; and,
- in-place reclamation of the pad and access.

Upon completion, the rigs, associated equipment and remaining consumables may be stored at the permitted storage site (LUP S12F-007) for use in future drilling programs or will be demobilized from the project area.

Closure and Reclamation

If any windrowed slash material remains from construction, it will be rolled back during the cleanup. Husky will ensure areas of ground disturbance are repaired and reseeded within one full growing season with a seed mix approved by the AANDC Land Use Inspector in Norman Wells. As standard practices are moving towards encouraging natural revegetation, the Terms and Conditions will address this issue. Areas prone to erosion will be controlled using techniques as outlined in the "*Erosion Control and Sedimentation Management Plan*" (Naviq Consulting Inc, 2013) that Husky has prepared for the project. The wellsites will be inspected in the summer of 2014 and annually thereafter for the duration of the lease term.

2.2 Additional Information Requested by SLWB

On June 6, 2013 SLWB staff submitted a series of questions to Husky for clarification of application components, one relating to the completeness check of the application. On June 11, 2013 Husky provided responses to those questions. A summary of key questions and answers is provided below.

Husky was asked to provide a list of all frac fluids and additives that could potentially be used in the program. Husky provided a complete list of all potential chemicals and associated MSDS.

Additional questions asked by staff are provided in italics, followed by Husky's responses.

Please confirm the coordinates of the well sites as they differ from the Water Licence Application to the Introductory Letter to the Waste Management Plan.

The coordinates listed in the EPP Introductory Letter are correct:

Location Name	Latitude	Longitude	Northing (m)	Easting (m)
Little Bear 0-41	65.014770° N	126.389651° W	7212640.90	622999.98
Little Bear G-70	64.991234° N	126.453664° W	7209896.51	620090.65

As a contingency, a second hydraulic fracturing of 0-41 and G-70 is stated to occur in the upper section of the Canol Formation with a contingency for a third fracture if necessary. Please provide the depths of these proposed fractures.

The target Lower Canol formation tops are anticipated to be –930 and –1360 m below surface on 0-41 and G-70 respectively with a thickness of –80 m each. Stimulation intervals will be planned after formation evaluation data is collected from the drilling operation. The planned and contingent intervals will be located within the Lower Canol formation and hence be at least –930 and –1360 m below surface on 0-41 and G-70 respectively.

For the proposed installation of up to three shallow groundwater monitoring wells per site:

- *The installation of groundwater monitoring wells is already authorized under SI2X-006. As such, this proposal would be an extension to the existing program and an amendment should be applied for under the SI2X-006 Land Use Permit.*

Please withdraw this proposal from the current application.

Husky hereby removes the proposal for the installation of additional groundwater monitoring wells from this application and will submit it as an amendment to LUP 512X-006. Please advise if any of the documents in the application package need to be resubmitted as part of this change.

In the Environmental Protection Plan, it states that:

'For the 0-41 and G-70 operations, Husky will not exceed the existing camp capacity of 190-persons authorized under WL S11L3-002.'

Although Water Licence S11L3-002 does authorize the use of water for camp operations, it is Land Use Permit S12F-007 that authorizes the use of land. As stated in the Environmental Protection Plan of the S12F-007 Land Use Permit:

'With the installation of a 100-person camp, all other camp operations will no longer be required, and will be discontinued.'

As the Base Camp is now constructed and as Husky has previously stated that this Base Camp will only be constructed to accommodate 100-persons, until an amendment has been submitted to the SLWB for an increase in capacity, the maximum allowable persons onsite is 100. Please confirm that Husky will not exceed this limit until an amendment has been submitted and authorized by the SLWB.

Husky will not exceed 100 persons in camp before we receive approval from the SLWB on our forthcoming application to consolidate existing LUPs in which we will be applying to expand the size of the camp.

For mitigations of wildlife, Husky has stated operations will be limited between the dates of May 1 and June 20 of each year, where possible, to avoid important seasonal activities of resident wildlife and migratory bird species. As the 'rut' season for caribou occurs in the fall, please provide further details on what mitigation measures Husky will have in place.

Husky recognizes mitigation is required to minimize project associated disturbance to caribou during both spring calving and the fall rut. Mitigation to minimize disturbance to caribou during spring calving (May-June) and the fall rut (September-October) will include having wildlife monitors on site, suspending operations when specific caribou cohorts (age/sex) are spotted within 500m of any project component and enforcing speed limits along the roads. Observations of female caribou during the spring calving period, or caribou groups that include a mature bull and females during the fall breeding period will be reported to the wildlife monitor immediately.

Horejsi (1981) suggested caribou more strenuously exert themselves when they encounter a fast moving vehicle. Although some level of habituation of caribou to traffic has been observed, the impacts of traffic depend on the type and degree of the stimuli in addition to past exposure. Thus, caribou in the project area which are generally not exposed to roads will have a more significant response to traffic. With an abundance of available adjacent habitat, displacement from higher to lower traffic areas may occur. Mitigation will include reducing speed limits during spring calving and the fall rut to 30 km/hr, when caribou are observed, to minimize road mortality and noise associated with faster moving vehicles. Mitigation will include reducing speed limits during spring calving and the fall rut to 30 km/hr, when caribou are observed, to minimize road mortality and noise associated with faster moving vehicles.

As development continues in the area in future years, the increasing activity during both calving and the rut may contribute to population level effects. To better mitigate these future impacts, Husky is conducting a baseline wildlife assessment that includes modelling caribou habitat suitability across their exploration leases. The goal is to identify high quality caribou habitat across the exploration leases and develop seasonal mitigation within these important areas for caribou. Following habitat suitability modelling, mitigation in future submissions will include avoiding or limiting activity in high quality caribou habitat during sensitive periods.

In the Anticipated Equipment List, under Fluid Storage and Fluids, it states that 120 tonnes of sand will be required. As stated in the Environmental Protection Plan, each hydraulic fracture requires 40 tonnes. If each well has a contingency for up to three fractures, would Husky not require 240,000 tonnes of sand to be onsite?

Husky is planning to conduct two fracture stimulations with one on each well. There is a contingent plan of one additional fracture stimulation if required. Each stimulation will require 40 tonnes of sand with the project total of 120 tonnes.

2.3 Process Requirements

Application Received: May 28, 2013

Application Deemed Incomplete: June 6, 2013

Additional Information Received: June 12, 2013

Application Deemed Complete: June 12, 2013

Application for WL Advertised: June 17, 2013

Application Forwarded for Review: June 12, 2013

Number of Review Agencies: 29

Review Period End Date: July 5, 2013

A Type A Land Use Permit is required for the following activities: the use of a vehicle or machine exceeding 10 t, clearing a trail or right-of-way that exceeds 1.5 m in width and 4 hectares in area, the use of a self-propelled power-driven machine for moving earth or clearing land, the use of a single container for the storage of fuel exceeding 4000 L and the use of a drill that exceeds 2.5 t. The application fee for the amount of \$150.00 was received with the application along with Land Use Fees of \$400.00 for 8 hectares.

An Industrial Type B Water Licence is required for the following: the use of 100 or more cubic metres of water per day. The application fee for the amount of \$30.00 was received with the application.

3. Comments

3.1 Permission of Land Owner

The proposed activity is located on a mix of Sahtu Surface Lands and Crown Lands in the Tulita District. Husky holds the exploration licence for parcel EL 463. An Access Agreement with the Tulita District Land Corporation Ltd. for EL 463 was made with the Tulita District Land Corporation as of September 1, 2011 and contains signatures from Husky and the Tulita District Land Corporation Ltd. A Benefits Agreement with the Tulita Land Corporation, the Norman Wells Land Corporation and the Fort Norman Metis Land Corporation is also in effect.

3.2 Community Consultation

Public meetings were held in Norman Wells on April 10, 2013 attended by 33 participants and in Tulita on April 11, 2013 attended by 28 participants. Separate meetings with the Norman Wells Land Corporation, Norman Wells Renewable Resources Council, the Tulita Renewable Resource Council, the Fort Norman Metis Land Corporation, the Tulita Land Corporation, the Tulita District Land Corporation and the Elders of Tulita were also held during the week of April 8-12, 2013. Information sessions were also held with the K'asho Got'ine District Land Corporation (during the district land corporation annual general meeting) on April 9, 2013 and with the Deline Land Corporation on April 8, 2013.

A PowerPoint presentation and/or wall maps were used to provide an overview of the proposed exploration program. General questions were asked by the attendees. For all meeting but one, there were six representatives from Husky to provide information and answer questions (during the K'asho Got'ine District Land Corporation meeting, three representatives were present).

3.3 Traditional Environmental Knowledge

No new Traditional Environmental Knowledge (TEK) was gathered regarding this amendment application. TEK was previously gathered and submitted by Husky under an associated LUP S11A-003. This included maps marking traditional trails, camp sites and cabins which were submitted to the SLWB and are on file. Due to the extensive nature of the information, duplication of the TEK at this time would be redundant.

Husky participated in a Knowledge Holders' Workshop which was facilitated by the SRRB in partnership with the TRRC. The workshop was held in Tulita from December 10 to 13, 2012. The foundation of the workshop centered on the importance of the environment, Traditional Land Use, Dene and Métis culture, the role of the RRCs, and the growing presence and activity of the oil and gas industry in the Central Mackenzie

Valley region of the Sahtu. The workshop agenda included PowerPoint presentations, information sharing, break-out sessions, and open dialogue was strongly encouraged to allow participants the opportunity to contribute to the group discussions throughout the four-day workshop.

3.4 Potential Environmental Impacts and Mitigation Measures

See the Preliminary Environmental Screening for potential environmental impacts and proposed mitigation measures.

3.5 Preliminary Environmental Screening

Section 124(1) of the *Mackenzie Valley Resource Management Act* requires the Sahtu Land & Water Board to undertake a Preliminary Screening of any proposed development prior to the issuance of a Licence, Permit, or Authorization.

Based on the information provided in the application and by review agencies (see Section 3.6 and 4), a Preliminary Environmental Screening (PES) was performed. The report concludes that the environmental impact of the proposed project can be mitigated with known technologies and no significant public concerns have been raised. The Draft PES Report and a Draft Staff Report were forwarded to the Mackenzie Valley Environmental Impact Review Board (MVEIRB) one week prior to the Board Meeting. If the Draft PES is approved by the Board, it will be forwarded to MVEIRB as an approved copy.

3.6 Conformity with Land Use Plan

There is no approved land use plan and therefore conformity of the application against the land use plan cannot be determined. Any rights or authorizations granted prior to the approval of the land use plan will be considered existing uses and allowed to continue following plan approval, including uses that do not conform to the approved zoning and the terms of the plan.

The SLWB has met the referral obligations set out in section 47 of the *Mackenzie Valley Resource Management Act*.

3.7 Draft Permit and Licence

A Draft Permit and Licence with Terms and Conditions has been prepared.

3.8 Security Deposit

Section 32 of the *Mackenzie Valley Land Use Regulations* and Section 12 of the *NWT Waters Regulations* provides that the Board may require a security deposit in an amount not exceeding the aggregate of;

- a) abandonment of the land use operation,
- b) restoration of the site of the land use operation,
- c) any measures that may be necessary after abandonment of the land use operation.

In setting the amount of security, the Board may consider;

- a) the ability of the applicant or prospective assignee to pay the costs,
- b) the past performance of the applicant or prospective assignee,
- c) the prior posting of security by the applicant pursuant to other federal legislation in relation to the land use operation,

- d) the probability of environmental damage or significance of any environmental damage.

Posted security shall be in the form of;

- a) a promissory note or letter of credit,
- b) a certified cheque,
- c) bearer bonds or performance bond,
- d) cash,
- e) such other form as the Minister may indicate to be satisfactory.

AANDC submitted a recommendation for security on both the Land Use Permit and Water Licence on July 5, 2013. For land, a value of \$244,946.00 was calculated using the Land Use Permit Security Worksheet. This value accounts for any overlapping operations with the existing S11A-003 Land Use Permit, currently with a security of \$142,000.00, and therefore will be returned once closure of this Land Use Permit occurs. For water, a value of \$361,659.00 was calculated using the RECLAIM model. There is currently no existing security on the S11L1-003 Water Licence.

Combined with the existing security, Husky's operations will have a total security of \$1,898,332.72 on EL 462 and EL 463.

Board staff agrees with the recommended security calculations. It is at the Board's discretion on how much security to take.

4. Other Agency Comments

The application was circulated to 29 organizations requesting a reply by July 5, 2013. To date 7 written responses have been received. The following organizations offered comments on the application:

- **Department of Fisheries and Oceans**
- **Environment Canada**
- **National Energy Board**
- **Environment and Natural Resources**
- **Aboriginal Affairs and Northern Development Canada**
- **Sahtu Renewable Resources Board**
- **Tulita Renewable Resource Council**

All review comments were emailed to the proponent for their information and follow-up action as required. Responses from Husky are also attached.

4.1 Discussion

A brief summary of comments are provided below. This section does not summarize all comments. Please review the attachments for complete comments

Department of Fisheries and Oceans Canada

In an email letter dated June 27, 2013, DFO has determined that there will be no impact to fish or fish habitat as per the habitat protection provision of the *Fisheries Act*.

Environment Canada

In an email letter dated July 5, 2013, EC had the following comments and recommendations:

- All field operations staff should be made aware of the Proponent's commitment to the mitigation measures and to be provided with appropriate advice/training on how to implement the measures.
- The groundwater baseline assessment should be submitted to regulators so they can have a good understanding of baseline conditions prior to the proposed operations.
- The criteria and reporting results should be submitted (captured in the terms and conditions) prior to discharging any drilling fluids or solids from the freshwater drilling to the quarry.
- Clarification as to how the freshwater drilling solids and fluids will be stored.
- To review the ingredients for the proposed chemicals, following CAPP's Fracturing Fluid Additive Risk Assessment and Management guidance, to possibly identify better alternatives from a human health and environmental perspective.
- The anticipated duration or timeframe for incineration of produced natural gas and natural gas liquids during the flow test should be provided.
- Ground-based activities and low-level aircraft over flights in the area should be avoided during early to mid-May.
- Monitoring should be undertaken to determine the effectiveness of mitigation and/or identify where further mitigation is required.
- All of EC's previous wildlife related comments still apply.

Husky response to EC

In an email letter dated July 16, 2013, Husky responded to EC comments:

- Husky agrees to make all field operations staff aware of the commitments to the mitigation measures.
- A final report for the groundwater monitoring well installation will be provided shortly.
- Criteria for testing drilling fluids or solids from the freshwater drilling is described in the Waste Management Plan submitted with the application.
- Fluids will be stored in either single or double-walled tanks. In either case a synthetic berm will be used as a secondary or tertiary containment.
- Husky requires that the suppliers of the fracture chemicals to assess each component for both its suitability in the fracture stimulation and environmental impact.
- Each well will be tested for approximately 20 days. It is uncertain how much gas will be produced since this program will assess untested sections of the Canol Formation which is a tight shale. The dispersion modeling used $10 \times 10^3 \text{m}^3/\text{day}$ as an anticipated high-end flow rate estimate. We expect the average to be $5 \times 10^3 \text{m}^3/\text{day}$ but will not be a constant flow. It is anticipated that the gas will initially be produced as surges and become a steady flow as the flow test progresses.
- Set back distances for flights will be maintained for all observed flocks during migration.

National Energy Board

In an email letter dated July 5, 2013, the NEB stated that they had no specific conditions for attachment to any regulatory authority's permits, licences or authorizations. They also made recommendations to be considered in the Preliminary Screening. Please see the attached letter for a list of detailed comments.

GNWT- Department of Environment and Natural Resources

In an email letter dated July 5, 2013, ENR had the following comments and recommendations:

- The incinerator should be capable of meeting the emission limits established under the CCME Canada-Wide Standards for Dioxins, Furans and for Mercury Emissions.
- The organics used in the freshwater based drilling fluids should be identified.
- The Board shall give formal approval prior to the pump off of any freshwater drilling fluids.
- Husky shall not deposit any drill cuttings that have been contaminated with oil based drilling fluids.
- The groundwater mapping and monitoring commitments should be included in the terms and conditions.
- A water use log should be utilized to track the volumes of water from all water sources and be included in the terms and conditions.
- Husky should prepare a detailed mitigation strategy report that demonstrates how any material effects on the quality, quantity or natural timing of water flow would or could be minimized and mitigated and should be a requirement of the water licence.
- Updated shapefiles of their proposed and existing project footprint should be submitted in order to keep track of habitat disturbances within the NWT boreal woodland caribou range.
- Husky should gather commitments and mitigation measures related to wildlife in a short Wildlife and Wildlife Habitat Protection Plan and included as a condition.

Husky response to ENR

In an email letter dated July 16, 2013, Husky responded to ENR comments:

- Husky agrees to have incinerators meet the requirements listed under the CCME Canada-Wide Standards for Dioxins, Furans and for Mercury Emissions.
- Husky will identify the additives used in the surface hole drilling fluid.
- Any drill cuttings that have been contaminated with oil based drilling fluids will not be deposited.
- The groundwater investigation is under Land Use Permit S12X-006.
- Husky currently tracks all water use with vehicle logs and transfers them to a tracking sheet. The tracking sheet specifies daily volume by water source and is available for inspection.
- Husky is in discussions with regulators regarding water withdrawal impacts and differences in impact of seasonal water use.
- Husky currently provides shapefiles to the SLWB.
- All of Husky's wildlife mitigation plans are included in the Environment Protection Plan that accompanies the application. Husky believes the section on wildlife is sufficient to describe the mitigation plan.

Tulita Renewable Resource Council

In an email letter dated July 5, 2013, the TRRC requested an extension of the review period to July 9, 2013 due to some misunderstandings. In a reply letter, the SLWB granted the extension to the end of day on July 9, 2013 due to the extenuating circumstances.

In an email letter submitted on July 9, 2013, the TRRC had the following comments and recommendations:

- Some members do not feel that they were given an opportunity to fully understand the project, nor were they adequately consulted with on the proposed

- project. A meeting in August to identify issues, solutions and next steps is being proposed.
- Members would like to work with Husky to develop an appropriate process for participating in monitoring programs and to have a more active role as participants in the environmental research programs as field assistants.
 - A new Traditional Environmental Knowledge study for each licence/permit should be required. Members who are experienced harvesters have identified a number of areas of concern that could be documented in this study.
 - Members are concerned how hazardous waste will be dealt with and would like to be involved in ongoing discussion about the safest way to deal with it.

Husky response to TRRC

In an email letter dated July 16, 2013, Husky responded to TRRC comments:

- Husky representatives met with the TRRC on April 11 to discuss the vertical well drilling program. The specifics of the program were presented to the TRRC members in attendance. Husky does plan to meet with the TRRC to discuss the horizontal well program prior to submitting the application for a land use permit for that operation.
- As requested by the Tulita District Land Corporation, Husky followed the conditions of the Benefits Agreement in awarding the environmental and wildlife monitoring contract. The Norman Wells Renewable Resources Council (NWRRC) was the successful bidder for this work. The NWRRC has agreed to work with the TRRC to include community members from Tulita when hiring monitors to work on Husky's project.
- TK studies have been completed for the exploration licences. Husky arranged for the TRRC to conduct these studies prior to the commencement of exploration in 2011. The study was to determine what traditional land use activities were occurring or have occurred in the past on the land encompassed by the licences irrespective of the proposed industrial activity or time of year. Husky is prepared to consider new information that may come to light through its project specific consultations with the TRRC, the NWRRC, the land corporations and the community.
- Waste handling is described in the Waste Management Plan that was included in the application.

Aboriginal Affairs and Northern Development Canada

An email letter was submitted on July 5, 2013 from AANDC-Water Resources Division and the North Mackenzie District. The North Mackenzie District recommended that standard conditions should apply to this activity and also a security deposit in the amount of \$244,946.00. The Water Resources Division provided an estimate for the security deposit in the amount of \$361,659.00 and the following comments:

- The proposed disposal of drilling waste must be done in accordance with the NWTWA and Regulations.
- Surface water sampling locations should be established to monitor potential effects from the current application.
- It is recommended that Husky further assess the results of the baseline water quality exceedances to ensure that monitoring methods are conducted according to QA/QC protocols.
- More groundwater monitoring locations should be added to adequately assess groundwater baseline conditions and flow direction.
- The Waste Management Summary Table should be updated to contain all wastes to be used or produced during operations.

- Secondary containment should be provided for all hazardous wastes and chemicals stored on site.
- Husky should establish a Spill Response Team for the operations which include the necessary responsibilities/duties of each staff.
- General spill response training and orientation should occur on a regular basis.
- Husky should confirm if there are existing fault lines in proximity to the wells.
- Best practices should be adopted by Husky to ensure fracturing activities are conducted within safe distances of any existing fault lines.
- Hydraulic fracturing operations should cease if a seismic event occurs during operations.
- It is recommended that Husky adopt best practices with respect to hydraulic fracturing operations including monitoring of well pressures, propagation heights and widths, etc.

Husky response to AANDC

In an email letter dated July 9, 2013, Husky responded to AANDC comments:

- Surface water quality locations have been identified and approved.
- The Slater River Surface Water Evaluation - Baseline Hydrological Assessment has been submitted to the SLWB.
- Husky plans to install up to three shallow groundwater monitoring wells per well site. These will be covered under the Land Use Permit S12X-006.
- Husky will amend the Waste Management Summary Table to contain all waste to be used or produced during operations.
- Husky agrees that secondary containing will be provided for all hazardous wastes and chemicals stored on site.
- Husky has agreed to establish a Spill Response Team for the operations.
- A spill training record can be provided upon request.
- The well locations have been sited with the objective of avoiding existing natural fault lines. No anomalous seismic events are contemplated but the operation will cease if they are encountered.
- As a member of CAPP, Husky has adopted industry best practices for its fracturing operations. It is standard practice to assess the effectiveness of the fracture stimulation and the fracture patterns and lengths are assessed as part of this process.

Sahtu Renewable Resources Board

In an email letter dated July 7, 2013, the SRRB had the following comments and recommendations:

- There are significant concerns about the proposed timing of the project. Best practice would be to conduct the program during winter frozen ground conditions. At the very least, the program should not be conducted during the fall rutting season or spring calving season.
- Construction of the all-weather access roads and well pads will create irreversible changes to the wetlands and hydrology of the area.
- No significant studies of boreal caribou have yet been conducted within Husky's lease areas and there is no documented scientific evidence to suggest that boreal caribou vacate the area during that time. There remains a risk that fall drilling may disrupt boreal caribou rutting. The SRRB is of the view that the proposed mitigation measures are unlikely to be effective.
- To mitigate long-term impacts in the future, Husky is proposing to conduct a baseline wildlife assessment that includes modeling caribou habitat suitability across their exploration leases. In order for this modeling exercise to be

effective, it should be done before Husky builds its all-weather access road and all-weather well pads.

- The timing of the program will likely disturb wolverines and bears as they are choosing their den sites in late October, and cause them to move away from the area.
- The addition of new gravel or soil will inevitably change the soil and water chemistry of the lease and surrounding areas.
- The destruction to wetland within the well pad areas and the changes to water chemistry in surrounding areas would likely have some impact on fish and other aquatic life. Fish surveys planned for the summer of 2013 should be redesigned to ensure that potential impacts on fish-bearing water bodies surrounding the well pad areas are assessed.
- Considerable further work is needed to compile TEK covering spring, summer, and fall seasons and to incorporate this input into project planning and mitigation measures.
- Husky should address current dust problems with the all-weather road and ensure that dust mitigation measures are improved going forward.

Husky response to SRRB

In an email letter dated July 16, 2013, Husky responded to SRRB comments:

- Long term testing of the wells is required to determine the economic viability of the Canol Formation. This cannot be completed in a single winter season. The all weather road was permitted to allow year-round operations that include drilling in the summer and fall.
- Husky is aware of the fall rutting season and spring calving seasons. It is anticipated that wildlife in the area will become aware of the activity and may choose to avoid the noise and movement. The operations contemplated will take place along, or very near to the existing all season road, airstrip and camp pads.
- A wolverine was observed a number of times on the project during the winter. The frequency of observation suggests that it did not move out of the area in response to the activity. Bears have also been observed during the current operations this spring and summer.
- Husky does not plan to disturb wetlands. The proposed access and wellsites are located away from wetlands. The primary land type is muskeg.
- Husky's new clearings will be at least 100m from any watercourse.
- The TK collected by the Tulita Renewable Resources Council addressed all of the traditional land uses over the exploration licences. Husky stated at the April 11 meeting that it is open to further discussion regarding additional studies but has made no commitment to them.
- Dust control on the additional access to the vertical wells can be managed by water. Longer term management may include dust control products provided they are environmentally friendly. Any other dust control product will be used only after approval by AANDC and the SLWB.

5. Conclusion

The Preliminary Environmental Screening Report did not identify any significant adverse environmental impacts or public concerns. All potential environmental impacts identified during public consultation and by review agencies can be mitigated with known technology and have been addressed in the Terms and Conditions of the Land Use Permit and Water Licence.

A Draft Preliminary Environmental Screening Report and Draft Staff Report have been provided to the MVEIRB for review.

6. Recommendation

It is recommended that the SLWB proceed with the regulatory process and implementation by issuing the Land Use Permit and Water Licence with Terms and Conditions, provided there are no objections by MVEIRB.

7. Reference Material Attached

- 7.1 Summary of potential drilling fluids
- 7.2 Review Comments from Department of Fisheries and Oceans
- 7.3 Review Comments from Environment Canada
- 7.4 Review Comments from National Energy Board
- 7.5 Review Comments from Environment and Natural Resources
- 7.6 Review Comments from Aboriginal Affairs and Northern Development Canada
- 7.7 Review Comments from Sahtu Renewable Resources Board
- 7.8 Review Comments from Tulita Renewable Resource Council
- 7.9 Response from Husky to Aboriginal Affairs and Northern Development Canada
- 7.10 Response from Husky to Environment and Natural Resources
- 7.11 Response from Husky to Tulita Renewable Resource Council
- 7.12 Response from Husky to Environment Canada
- 7.13 Response from Husky to Sahtu Renewable Resources Board

Respectfully submitted,



Angela Love
Regulatory Specialist

Executive Director Comments:

I agree with the recommendation and the conclusion found within this staff report.



Paul Dixon
Executive Director