# Sahtu Land and Water Board

# Staff Report

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| **Division:** Land Program | **Report No.** 1 |
| **Date Prepared:** November 28, 2012 | **File No.** S12X-006 |
| **Meeting Date:** December 5, 2012 | |
| **Subject:** Type A Land Use Permit Application submitted by Husky Oil Operations Ltd. | |

## 1. Purpose/Report Summary

To inform the Board about a Type A Land Use Permit (LUP) application by Husky Oil Operations Limited (Husky) for a groundwater baseline drilling program approximately 40 km south-southeast of the Town of Norman Wells, NWT.

## 2. Background

### 2.1 Project Overview

For the 2012/2013 winter season, Husky plans to drill twenty shallow drilling sites along with five bedrock drilling sites (up to three wells per site) which will be used to assess the baseline water quality within Exploration Licence (EL) 462 and 463 and to assess potential bedrock aquifers as a source of water to support future operations in the area. A multiyear scientific research license has been submitted to the Manager of Scientific Services with the Aurora Research Institute for this phase of the project titled 'Application 2099: EL 462 and EL 463 – Regional Hydrology and Surface Water Quality Sampling'.

The program consists of the following components:

- Mobilization of a wheeled air/water/mud-rotary drilling rig by winter road to the program area;
- Mobilization of a truck-mounted auger rig by winter road to the program area;
- Use of existing clearings, helipads and recently cleared access to spot the drilling rigs;
- Drilling of up to 15 holes at five locations (three holes per location) to evaluate bedrock aquifers to a maximum depth of 150 metres each;
- Drilling of 20 holes to evaluate surficial groundwater to a maximum depth of 30 metres each or three metres into the bedrock;
- Collection of cuttings and groundwater samples for further analysis;
- Logging of boreholes using electro-mechanical down hole logging tools;
- Flow testing freshwater bedrock aquifers;
- Installation of steel well casing and wellheads in bedrock wells;
- Installation of PVC monitoring wells in surficial boreholes;
- Installation of thermistors to monitor ground temperature adjacent to selected monitoring wells;

- The storage of minimal amounts of fuel, and motor and hydraulic fluids on site; and
- Demobilization of the drilling rig and related equipment using the winter road.

**Shallow Groundwater Investigation**

Drilling locations will utilize existing clearings, cutlines or natural open areas wherever possible and will be 25m by 25m. Thermistors will be installed adjacent to selected monitoring wells for on-going assessment of permafrost and freeze-thaw conditions in the vicinity of the wells. Boreholes will be drilled using a truck-mounted auger rig and located in areas expected to have sufficiently thick surficial deposits where groundwater may be presented. Samples will be collected from the cores, which will be continuously logged during drilling. Where water is encountered, a monitoring well consisting of PVC pipe and screen will be installed with a sand filter pack over screened intervals and bentonite grout to surface. Aquifers will be characterized by a slug or pump test for yield and hydraulic conductivity. Samples will be collected for determination of baseline water quality. Table 1 describes the proposed analytical parameters to be analyzed.

| **Table 1. Baseline Water Quality. Proposed Analytical Parameters** | |
|---|---|
| **General Water Quality**<br>pH, EC, Ca, Mg, Na, K, Fe, SO4, Cl, Mn, carbonate, bicarbonate, NO2+, NO3-N, PO4, alkalinity, hardness, TDS, DO | **Microbiology in Water**<br>Total and fecal coliforms, *E. Coli* |
| **Total Dissolved Metals**<br>Al, Sb, As, Ba, Be, Bi, B, Cd, Ca, Cr, Cr+6, Co, Cu, Fe, hg, Pb, Li, Mg, Mn, Mo, Ni, K, Se, g, Na, Sn, Sr, S, Tl, Ti, U, V, Zn | **Isotope Analysis**<br>Used to establish age and can be used to evaluate levels of contamination and source. |
| **Hydrocarbons and Volatile Organics in Water**<br>Volatile organic compounds (by EPA method 8260b) and total hydrocarbons (F1, F2, and F3) in water | **Glycols and Amines in Water**<br>Methanol, glycols including ethylene glycol, propylene glycol, diethylene glycol, triethylene glycol, and tetraethylene glycol |
| **Polyaromatic Hydrocarbons in Water**<br>Acenapthene, Acenapthylene, Acridine, Anthracene, Benzo(a)athracene, Benzo(b) fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Fluorene, Napthalene, Phenanthrene, Pyrene, and Quinolene | **Frac Fluid Chemicals in Water**<br>(additional analyses not included in other parameters) TBD |

Where water is not encountered and boreholes are to be abandoned, they will be backfilled with cuttings and bentonite grout.

**Bedrock Groundwater Drilling Program**

Drilling locations will be 50m by 50m and be selected to minimize the footprint. Lease construction will consist of the clearing of scrub spruce and shrubs using low ground pressure bulldozers, with the use of shoes or half-round pipe, or mulchers. If required, hand slashing may also be employed. Drilling sites will be leveled by constructing an ice/snow pad. Drilling of up to three boreholes at each of the five locations will utilize an air/water/mud rotary drilling rig. Initially, drilling will commence using compressed air, will be switched to water if groundwater is encountered or when more pressure is

required and finally to a bentonite clay-based drilling fluid if/when an artesian flow is encountered. Surface casing will be installed over the shallow surficial zone, and to approximately three metres into the bedrock. The total depth of these wells will be restricted to 150m below ground level or less.

Drill cuttings will be collected and logged during operations. Upon completion, wire-line logs will be run to measure natural gamma ray emissions, physical properties and electrical responses. Casing will be installed with a well screen across the aquifer of interest. Screens will be installed with a filter sand pack and the remaining well bore annulus will be grouted with a bentonite cement mixture to provide isolation between aquifers. Water samples will be collected and analyzed following the proposed analytical parameters as outlined in Table 1.

Flow and/or pump tests will be preformed to evaluate reservoir quality and to estimate production rates. In the event that multiple aquifers are encountered in a borehole, up to three nested holes may installed to flow test separate zones. Upon completion, the wells will be capped with a wellhead, shut in, and suspended.

**Water Usage**

Water will be required for the bedrock aquifer assessment. For the construction of ice pads, an estimate of 200$m^3$ per site is required. For the drilling of the groundwater monitoring wells, an estimate of 36$m^3$ per well is required. Water will be sourced from water sources previously licenced under Water Licence S11L1-003. Table 2 presents the anticipated water budget by source.

Table 2: Anticipated Water Budget for Bedrock Drilling Site Construction

| Drilling Site | Estimated Volume for Construction | Source | Estimated Volume for Drilling | Source |
|---|---|---|---|---|
| MW-4 | 200$m^3$ | WS2 | 36$m^3$ | WS7 (Mackenzie River) |
| MW-6 | 200$m^3$ | | 36$m^3$ | |
| MW-9 | 200$m^3$ | | 36$m^3$ | |
| MW-10 | 200$m^3$ | | 36$m^3$ | |
| MW-19 | 200$m^3$ | WS6 | 36$m^3$ | |
| **Total** | **1000$m^3$** | | **180$m^3$** | |

**Waste Management**

Drilling waste for bedrock water wells is anticipated to consist of native rock cuttings, fresh water and/or clay-based drilling fluids. Native rock cuttings consist of unconsolidated surficial material and bedrock. Cuttings will be dry or damp and will be stored in a metal shale bin and be incorporated as fill into road construction planned for the 2012/2013 winter season.

If aquifers are encountered, water will be used to circulate the cuttings. Waste will consist of inert rock cuttings and fresh water, which will be stored in an onsite 400bbl tank. After testing, water will be discharged to the land using Alberta ERCB Directive 55 as a best practice. Directive 55 allows for discharge of water with chloride content of 500mg/L or less, pH between 6.0 and 9.0 and no visible hydrocarbon sheen.

If artesian aquifers are encountered, a bentonite clay drilling additive will be used to control the flow of water in the well while drilling. Waste will consist of inert mixture rock

cuttings, fresh water and bentonite clay. Waste will be stored on a drying pad until after breakup, where it will be disposed to a quarry site (Land Use Permit S12F-007 and Water Licence S12L8-007 currently under review).

During the flow and/or pump testing, water produced will be stored in a 400bbl tank. Water will be tested, and if it meets the discharge criteria, it will be released to the land through diffuser hoses upon approval from the Inspector.

If saline water is encountered, the well will be plugged to prevent flow to surface. Any salt water produced during drilling will be diverted to a 400bbl tank and will be disposed of at an approved facility in Alberta.

Any domestic waste will be collected from the site for incineration at the campsite. Waste from the chemical toilet will be removed to the construction camp for treatment by the camp sewage treatment plant.

**Crew Accommodations**

There will be eleven people in the drilling crew, lodged in the construction camp that has been permitted under Land Use Permit S11T-002. A wheeled wellsite trailer will be temporarily stationed at each drilling site as a heated workspace and shelter for the drilling crews and technical staff while on-site.

**Fuel Storage**

Husky plans to transport diesel fuel for the drilling rig to the program area from Norman Wells on an as-needed basis by tank truck.

Fuel will be stored on site as follows:

| Fuel | # of Containers | Capacity | Location |
|---|---|---|---|
| Diesel | 2 | $15m^3$ (95bbl) | Fuel storage yard at the Staging Area (permitted under LUP S11T-002) |
| Propane | 4 | 45kg (100lb) | Fuel storage yard at the Staging Area (permitted under LUP S11T-002) |

**Emergency Response and Spill Contingency Planning**

Husky has developed an Emergency Response and Spill Contingency Plan that will be adhered to throughout the course of the project.

**Equipment**

Equipment will be transported to site via barge and GNWT winter road. See equipment list attached.

**Closure and Reclamation**

Monitoring wells will be left suspended so that they can be accessed for annual sampling. Thermistor data loggers will be downloaded annually. At the point in time that the installations are no longer required, they will be decommissioned as follows:

- Casing in monitoring wells will be pulled or cut off below ground level, and boreholes will be filled with bentonite;
- Thermistor stations will be cut-off below ground level and backfilled;

- Water wells will be filled with bentonite, and will be and cut-and-capped below ground level; and
- Abandoned water well sites will be remediated within one full growing season.

Any slash material will be rolled back during the clean-up. Husky will ensure areas of ground disturbance are repaired and reseeded within one full growing season following abandonment 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.

### 2.2 Process Requirements

**Application Received:** October 18, 2012
**Additional Information Received:** October 26, 2012
**Application Deemed Complete:** October 26, 2012
**Application Forwarded for Review:** October 26, 2012
**Number of Review Agencies:** 29
**Review Period End Date:** November 21, 2012
**Land Use Permit 42-Day Period End Date:** December 7, 2012
**Anticipated Start Date from Applicant:** January 1, 2012
**Anticipated Completion Date from Applicant:** December 31, 2017

A Type A Land Use Permit (LUP) is required for the following activities: use of vehicles in excess of 10t, the use of a self-propelled power-driven machine for moving earth or clearing land, and the use of a drill that exceeds 2.5t. The application fee for the amount of $150.00 plus land use fee of $0.00 was received in our office on October 18, 2012.

## 3. Comments

### 3.1 Permission of Land Owner

The proposed activity is located on a mix of Sahtu Surface Lands and Crown Land. Husky holds the exploration licence for parcel EL 463 and 462. An Access Agreement was signed with the Tulita District Land Corporation Ltd. The document was dated September 1, 2011 and contains signatures from Husky Oil Operations Limited 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

Community engagements were held in Tulita on May 28, 2012, in Norman Wells on May 31, 2012 and in Fort Good Hope on May 29, 2012. Separate meetings with the board members of the Tulita Land Corporation were also held on May 28, 2012, with board members of the Fort Norman Métis Land Corporation on May 28, 2012, with board members of the Norman Wells Land Corporation on May 30, 2012, with board members of the Yamoga Land Corporation on May 29, 2012 and with board members of the Deline Land Corporation on May 30, 2012. A PowerPoint presentation or wall maps were used to provide an overview of the proposed exploration program. General questions were asked by the attendees. There were six representatives from Husky and one from Northern Envirosearch/MWH Canada to provide information and answer questions.

There were 40 attendees at the Tulita public meeting, 20 attendees at the Norman Wells public meeting, 23 attendees at the Fort Good Hope public meeting, 7 attendees from the Tulita Land Corporation, 7 attendees from the Fort Norman Metis Land Corporation, 8 attendees from the Norman Wells Land Corporation, 6 attendees from the Yamoga Land Corporation and 9 attendees from the Deline Land Corporation.

## 3.3 Traditional Environmental Knowledge

No Traditional Environmental Knowledge (TEK) was gathered regarding the Husky groundwater baseline drilling program. TEK was previously gathered and submitted by Husky under the 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. Some of the summarized points of the TEK study are:

- The area is rich with vegetation that provides for a large variety of wildlife;
- The people who use the area are greatly concerned over what impacts there may be to the natural habitat. Specifically to the 'Fish Lakes' identified on the map;
- There are woodland caribou that roam the area along the chain of lakes in the central portion of EL463;
- Water that drains from streams in the southern hills of EL462 form the Little Bear River which contains fish during high water levels in the summer. During the winter these streams freeze to bottom;
- The chain of Fish Lakes as well as the small creeks and streams provides for a large variety of fish species;
- The grayling run up the Mackenzie River to the small streams and creeks usually begins in June as the species starts migrating to its spawning areas, notably Sucker Creek and Blue Fish Creek;
- Lake whitefish run to spawn at different times of the year under the ice. They spawn in Yellow Lake in November, in Fall Stone Lake and the chain of Fish Lakes in December;
- The southern end of EL 462 is located in rough terrain and very few lakes and the area north of the Little Bear River is fairly flat; and
- There are traplines in EL462 and EL463.

## 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 have been 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

A Draft Permit with Terms and Conditions has been prepared.

### 3.8 Security Deposit

Section 32 of the *Mackenzie Valley Land Use 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.

In an emailed letter dated November 14, 2012, Aboriginal Affairs and Northern Development Canada (AANDC) – District Manager has recommended that a Security Deposit of $35,825.72 be sought from the proponent. A security model was attached to the letter.

Board staff agrees with the recommended security as proposed by AANDC. It is the decision of the Board whether or not a Security Deposit is required.

## 4. Other Agency Comments

The application was circulated to 29 organizations requesting a reply by November 21, 2012. To date 8 organizations have responded. The following organizations offered comments on the application:

- **Department of Fisheries and Oceans Canada**
- **AANDC**
- **Department of Transportation**
- **Tulita Renewable Resources Council**
- **Environment Canada**
- **Environment and Natural Resources**
- **Sahtu Renewable Resources Board**
- **Deline Renewable Resources Council**

Please see the attachments for complete comments.

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

## 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.

A Draft Preliminary Environmental Screening Report and Draft Staff Report have been provided to the MVEIRB for review. Should the Board grant approval, the Permit could be issued on December 5, 2012, provided there are no objections by MVEIRB.

## 6. Recommendation

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

## 7. Reference Material Attached

7.1 Security Deposit Estimate from AANDC
7.2 Equipment List for Groundwater Drilling Program
7.3 Review Comments from the Department of Fisheries and Oceans Canada
7.4 Review Comments from AANDC
7.5 Review Comments from the Department of Transportation
7.6 Review Comments from the Tulita Renewable Resource Council
7.7 Review Comments from Environment Canada
7.8 Review Comments from Environment and Natural Resources
7.9 Review Comments from the Sahtu Renewable Resources Board
7.10 Review Comments from the Deline Renewable Resources Council
7.11 Response from Husky to Environment and Natural Resources
7.12 Response from Husky to the Tulita Renewable Resource Council
7.13 Response from Husky to the Sahtu Renewable Resources Board

Respectfully submitted,

Angela Love
Regulatory Specialist

Executive Director Comments:

Paul Dixon
Executive Director