Prosper
PETROLEUM LTD

November 17, 2014

Alberta Energy Regulator
4th Floor, Twin Atria Building
4999 – 98 Avenue
Edmonton, AB T6B 2X3

**Attention: Mr. Hasin Haroon**
**In Situ EPEA Authorizations**

Dear Mr. Haroon:

**Re: Second Supplemental Information Request; Prosper Rigel In Situ Oil Sands Project (EPEA Application No. 001-341659)**

Prosper Petroleum Ltd. submitted the Application for Approval of the Rigel Oil Sands Project in November 2013.

Prosper received the first round of supplemental information requests (SIRs) from the Alberta Energy Regulator (AER) regarding the Environmental Protection and Enhancement Act (EPEA) application in June 2014 and responded in August 2014. A second round of SIRs was received from the AER on September 9, 2014. The hyperlinked SIR responses is provided in this submission of November 2014.

Please contact the undersigned at (403) 930-5302 if you have any questions.

Sincerely,

Carrie Cochran
V.P. Stakeholder Affairs
Prosper Petroleum Limited

Attachment: Round 2 Supplemental Information Request Responses

# Prosper Petroleum Ltd. - Rigel Oil Sands Project

## Supplemental Information Request Round 2 Responses and Project Update

## Environmental Protection and Enhancement Act (EPEA) Application No. 001 - 341659

## TABLE OF CONTENTS



## LIST OF TABLES



## APPENDIX

# 1 Introduction

Prosper Petroleum Ltd. submitted the Application for Approval of the Rigel Oil Sands Project (the Project) in November 2013 (the Application).

Prosper received the first round of supplemental information requests (SIRs) from the Alberta Energy Regulator (AER) regarding the *Oil Sands Conservation Act* (OSCA) application in May 2014 (OSCA Round 1 SIRs). Prosper provided responses to the OSCA Round 1 SIRs in July 2014. Prosper received the first round of SIRs from the AER regarding the *Environmental Protection and Enhancement Act* (EPEA) application in June 2014 (EPEA Round 1 SIRs) and responded in August 2014.

A second round of SIRs regarding the EPEA application (EPEA Round 2 SIRs) was received from the AER on September 9, 2014. Responses to these SIRs are provided in this submission of November 2014.

Prosper has identified that Table 6.5-1 of the Application contained errors related to the units presented to measure concentrations. As a result the table was updated and revisions were made to Section 6.5.3.2 of the Application. A summary of these revisions is presented in Appendix A.

# 2 EPEA Application Supplemental Information Request Responses

## 2.1 General

| | |
|---|---|
| 1 | **SIRR#1, Page 5, Section 2.2, Air, Response 3.a., Table 3-1, Stack Parameters and Emissions Associated with the Project (Excluding the Flare Stack)**<br>Explain what method Prosper used to obtain the emission rates of $SO_2$, $NO_X$, CO and $PM_{2.5}$ for the boilers, cogeneration units and emergency generators. |

**Response:**

The methods used to estimate the emission rates of sulphur dioxide ($SO_2$), oxides of nitrogen ($NO_X$), carbon monoxide (CO) and fine particulate matter less than 2.5 µm ($PM_{2.5}$) from the boilers, cogeneration units and emergency generators are presented in Table 1-1.

**Table 1-1 Methods for Emission Rates Calculations**

| Source | Method of Emission Calculation | | | |
|---|---|---|---|---|
| | $SO_2$ | $NO_X$ | CO | $PM_{2.5}$ |
| HP Boilers #1 and #2 | Engineering Calculations: Combusts mixed gas with 0.067% (molar percentage) $H_2S$ and flow rate of 247.348 $e^3m^3/d$. | Emission Factor: 40 g/Gj (AENV 2007) | Emission Factor: 84 lb/$10^6$ SCF (U.S. EPA 1996) | Emission Factor: 7.6 lb/$10^6$ SCF (U.S. EPA 1996) |
| Utility Boiler | Combusts pipeline natural gas – negligible $SO_2$ emissions | Emission Factor: 26 g/Gj AENV 2007 | Emission Factor: 84 lb/$10^6$ SCF U.S. EPA 1996) | Emission Factor: 7.6 lb/$10^6$ SCF (U.S. EPA 1996) |
| Cogeneration Units #1 and #2 | Combusts pipeline natural gas – negligible $SO_2$ emissions | Emission Factor: 280 g/Gj 240 g/Gj (turbine) + 40 g/Gj (boiler) (CCME 1992) and (AENV 2007) | Emission Factor: 0.015 lb/MMBtu (U.S. EPA 1996) | Emission Factor: 0.0066 lb/MMBtu (U.S. EPA 1996) |
| Emergency Generator #1 and #2 | Emission Factor: 0.0505 lb/MMBtu (0.05% sulphur) U.S. EPA AP- 42 | Emission Factor: 3.2 lb/MMBtu (U.S. EPA 1996) | Emission Factor: 0.85 lb/MMBtu (U.S. EPA 1996) | Emission Factor: 0.0697 lb/MMBtu (U.S. EPA 1996) |

**Reference:**

Alberta Environment (AENV). 2007. *Interim Emission Guidelines for Oxides of Nitrogen (NOx) for New Boilers, Heaters and Turbines using Gaseous Fuels for the Oil Sands Region in the Regional Municipality of Wood Buffalo North of Fort McMurray based on a Review of Best Available Technology Economically Achievable (BATEA).* Approvals Interim Policy. Oil Sands Environmental Management Division. December 14, 2007. http://environment.alberta.ca/documents/Oil-Sands_Interim_Emission_Guidelines.pdf

Canadian Council of Ministers of the Environment (CCME). 1992. *National Emission Guideline for Stationary Combustion Turbines*. ISBN: 0-919074-85-5. Winnipeg, Manitoba. December 1992. http://www.ccme.ca/assets/pdf/pn_1072_e.pdf

United States Environmental Protection Agency (U.S. EPA). 2010. *AP 42. Compilation of Air Pollutant Emission Factors*. Accessed October 2014. http://www.epa.gov/ttn/chief/ap42/index.html

| | |
|---|---|
| 2 | **SIRR#1, Page 6, 7, 8, Section 2.2, Air, Question 3.c.**<br><br>In Prosper's original application, the High Pressure Boiler and Utility Boilers are rated at 90.3 MW and 4.4 MW respectively (*Appendix G, Section 3.1, Project Emission Sources*).<br><br>In SIRR#1, Page 6, $NO_X$ sample calculation for the HP Boiler, Prosper specifies the heat input as 108.754 MW. On Page 7, Table 3-3, the HP Boiler and Utility Boiler are rated at 108.8 GJ/h and 5.8 GJ/h respectively.<br><br>a) Clarify the discrepancies between the original application values and the SIRR#1 values for the power ratings. Confirm the actual rating in MW for the boilers and cogeneration units. |

**Response:**

The power ratings provided for the high pressure (HP) boiler and utility boilers in the Application (Appendix G, Section 3.1) are output power ratings. The power ratings presented in the response to EPEA Round 1 SIR 3c (Page 6), are input power ratings, on which emission calculations were based. The units presented in EPEA Round 1 SIR 3c, Table 3-3 for the HP boiler and utility boiler should have been expressed as 108.8 MW and 5.8 MW (input power), not GJ/h. The correct units (MW) were used in the emission calculations.

| | |
|---|---|
| 2 | b) Confirm the power rating in MW for both the emergency generators. |

**Response:**

The power ratings (output power) for the emergency generators are 1.5 MW and 3.0 MW.

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|---|---|
| 2 | c) Recalculate the NOx emissions based on the values provided in 2.a. and 2.b. and update Table 3-1 and Table 3-3 for the boilers, cogeneration units and emergency generators. Provide the detailed calculations used for each emission source. |

**Response:**

As described in Response 2a and 2b, there are no changes to the NOx emissions presented in Tables 3-1 and 3-3 (EPEA Round 1 SIR 3). As described in the response to EPEA Round 1 SIR 3c, the modelled NOx emissions rate for the cogeneration units (1.967 g/s) is less than the calculated emission rate based on regulatory compliance limit (2.13 g/s). Prosper is requesting a NOx emission limit of 1.967 g/s (7.1 kg/h) as part of the EPEA Approval. Detailed NOx emissions for each source are presented below.

<u>**NOx Emission Calculations:**</u>

*HP Boiler #1 and #2 (for each):*

$$NOx\left(\frac{g}{s}\right) = 40\frac{g}{Gj} \times 108.75\frac{MW}{hr} \times 3.6\frac{Gj}{MW} \times \frac{1hr}{3600s} = 4.35\frac{g}{s}$$

*Utility Boiler:*

$$NOx\left(\frac{g}{s}\right) = 26\frac{g}{Gj} \times 5.78\frac{MW}{hr} \times 3.6\frac{Gj}{MW} \times \frac{1hr}{3600s} = 0.15\frac{g}{s}$$

*Cogeneration Units #1 and #2 (for each):*

$$NOx\left(\frac{g}{s}\right) = \left(7.5\frac{MW}{hr} \times 3.6\frac{Gj}{MW} \times 240\frac{g}{Gj} + 30\frac{Gj}{hr} \times 40\frac{g}{Gj}\right) \times \frac{1hr}{3600s} = 2.13\frac{g}{s}$$

*Emergency Generator #1:*

$$NOx\left(\frac{g}{s}\right) = 3.2\frac{lb}{MMBtu} \times 0.948\frac{MMBtu}{Gj} \times 18.2\frac{Gj}{hr} \times 454\frac{g}{lb} \times \frac{1hr}{3600s} = 6.95\frac{g}{s}$$

*Emergency Generator #2:*

$$NOx\left(\frac{g}{s}\right) = 3.2\frac{lb}{MMBtu} \times 0.948\frac{MMBtu}{Gj} \times 36.4\frac{Gj}{hr} \times 454\frac{g}{lb} \times \frac{1hr}{3600s} = 13.90\frac{g}{s}$$

| | |
|---|---|
| 2 | d) Confirm that the emissions rates calculated in 2.c. have been used as inputs in the air dispersion modelling. If the emissions rates used as inputs are different, provide a discussion on what the impact would be on ground level concentrations. |

**Response:**

The emissions used in the calculations in Response 2c were assessed in dispersion modelling. No update of the dispersion model is required.

## 2.2 Land Conservation and Reclamation

| | |
|---|---|
| 3 | **SIRR#1, Page 37, Section 2.5, Land Conservation & Reclamation, Questions 17.a. and 17.b.**<br>Prospers response to SIR#1, Question 17 referred to the answer provided to Questions 10 and 11. The response provided states that, "A perched water table in the Anzac (ANZ) SMU was reported at depths greater than 65 cm bgs, which was not considered to be a constraint for topsoil and subsoil stockpiles." Gleysolic soils characteristic of the ANZ SMU contain water table that are seasonally dependent and may fluctuate greatly. Therefore, saturation of the underlying stockpile foundation is considered a constraint to the stability of the stockpile foundation.<br>a) Confirm whether other potential stockpile locations on well-drained upland soils have been explored and describe any constraints observed at the alternative locations. |

**Response:**

Prosper explored alternate potential stockpile locations and presented adjustments to soil stockpile locations in the response to EPEA Round 1 SIR 10. These stockpile locations take into consideration the stockpile area requirements and the distribution of the soil map units (SMUs). The upland Legend (LDG) SMU in Borrow Pit B is expected to provide the most extractable, suitable fill from this area (EPEA Round 1 SIR 10, Figure 10-1). Locating the peat, topsoil and subsoil stockpiles in the LDG SMU in Borrow Pit B is not a preferred option, because doing so will reduce the effective area for the extraction of fill. As described in Response 3b, Prosper expects that the potential stability constraints related to placing the stockpiles on the Anzac (ANZ) SMU can be mitigated.

| | |
|---|---|
| 3 | b) If other suitable stockpile locations are not available, describe how Prosper plans considered, such as padding material similar to that described for stockpiles on organic soils, to ameliorate the potentially unstable foundations. |

**Response:**

Prosper will consider placing geotextile, and if required geogrid, onto the stockpile area within the ANZ SMU before depositing salvaged topsoil and subsoil material into separate stockpiles. The placement of geotextile and geogrid before stockpiling will provide a foundation and a separation barrier for the stockpiles. Topsoil materials will be salvaged from the subsoil stockpile area before geotextile, and if required geogrid, are placed.

Shallow perched water in the ANZ SMU within Borrow Pit B is expected to be drawn down after peat is extracted from the adjacent Meadow (MDW) SMU before the borrow pit is excavated. Drawdown of shallow water in the ANZ SMU will additionally provide a suitable foundation for the placement of soil stockpiles on geotextile. As was shown on Figure 10-1 (EPEA Round 1 SIR 10), the peat will not be removed within the peat stockpile area at the east end of Borrow Pit B. Geotextile will be placed on the peat surface before the salvaged peat is stockpiled. Prosper will also consider constructing a ditch along the inner edge of

Borrow Pit B to help manage surface and near surface water flows along its south and east boundaries.

# APPENDIX A

## UPDATES TO SECTION 6.5

Prosper Petroleum Ltd. submitted the Application for Approval of the Rigel Oil Sands Project (the Project) in November 2013 (the Application).

The measured concentrations for metals presented in Table 6.5-1 of the Application were presented with units of µg/L for summer 2009 when they should have been presented as mg/L, and these values were median values taken from Attachment E, Table E-1 of the *Water Quality Baseline Report* (Summer 1972 to 2009; Dover OPCO 2010), not the 2009 sampling data from that same report. Table 6.5-1 of the Application has been corrected (Table A-1) and the analysis has been re-evaluated based on the corrected data.

Based on the updated table, the following revisions apply to Section 6.5.3.2 of the Application:

- Unnamed water bodies WB-1, WB-2, and WB-3 within the lease area had pH values of 7.76, 8.16, and 7.97, respectively, and conductivities of 183, 269, and 283 µS/cm (Table A-1; Dover OPCO 2010). WB-4 had neutral pH values and specific conductance of 46 µS/cm at temperatures of 20.5°C (Dover OPCO 2010). Summer dissolved oxygen (DO) concentrations in 2009 at WB-1 and WB-4 were 3.35 and 6.05 mg/L, respectively (Table A-1). Low DO values may indicate the water bodies are not suitable for at least some life stages of aquatic life. The low values may be due to various factors including small water body size, high bacterial respiration, and chemical oxidation of organic matter.

- Summer 2009 measurements (Table A-1) of total nitrogen at WB-1 and WB-4 were 1.52 and 1.47 mg/L, respectively. These values were previously considered to be above guidelines (AENV 1999); however, the current 2014 Alberta Environment and Sustainable Resource Development (ESRD) guidelines do not specify a guideline value for total nitrogen other than a requirement that nitrogen should not be increased over existing conditions (ESRD 2014).

- Concentrations of other parameters were below guidelines with the exceptions of total aluminum at WB-4; total iron at WB-1, WB-2, WB-3, and WB-4; and total silver at WB-1. Levels of these parameters are characteristically high in the area (see summer median values for water bodies within/near local area Table A-1).

**References:**

Alberta Environment (AENV). 1999. *Surface Water Quality Guidelines for Use in Alberta*. Environmental Assurance Division, Science Standards Branch. Publication No. T/483. ISBN: 0-7785-0897-8. Edmonton, Alberta. November 1999. http://environment.gov.ab.ca/info/library/5713.pdf

Alberta Environment and Sustainable Resource Development (ESRD). 2014. *Environmental Quality Guidelines for Alberta Surface Waters.* Water Policy Branch, Policy Division. Edmonton, Alberta. July 14, 2014. ISBN: 978-1-4601-1524-4. 48 pp. http://esrd.alberta.ca/water/education-guidelines/documents/EnvironmentalQualitySurfaceWaters-Jul14-2014.pdf

Dover Operating Corp. (Dover OPCO). 2010. *Water Quality Baseline Report, Dover Commercial Project.* Submitted to Dover Operating Company. 09-1346-1011. December 2010. 102 pp.

**TABLE A-1 WATER QUALITY RESULTS**
Prosper Petroleum Ltd.
096-17 W4M

| Sample Site | | --- | --- | --- | --- | --- | --- | --- | AENV Freshwater Aquatic Life^ | CCME Water Quality Guidelines - Freshwater^^ |
|---|---|---|---|---|---|---|---|---|---|---|
| Name | | Namur Lake | Namur Lake Summer | WB-1 | WB-2 | WB-3 | WB-4 | Within/Near Local Study Area | | |
| Date | Unit | Summer 2009** | Median 1972-2009** | Summer 2009** | 26-Aug-13 | 26-Aug-13 | Summer 2009** | Summer Median 1977-2009** | | |
| Easting | | --- | --- | --- | --- | --- | --- | --- | | |
| Northing | | --- | --- | --- | --- | --- | --- | --- | | |
| Sample Number | | --- | --- | --- | 16780130826001 | 16780130826003 | --- | --- | | |
| **Conventional Parameters** | | | | | | | | | | |
| pH | | 7.36 | 7.3 | 7.76 | 8.16 | 7.97 | 6.89 | 7.9 | **6.5-8.5** | **6.5-9.0** |
| Conductivity (EC) | µS/cm | 63.3 | 60 | 183 | 269 | 283 | 45.7 | 160 | **NS** | **NS** |
| Dissolved Oxygen | mg/L | 8.39 | 9 | ***3.35*** | --- | --- | ***6.05*** | --- | **5.0[AA]/6.5[CA]** | **5.5-9.5** |
| Hardness ($CaCO_3$) | mg/L | 28.4 | 23 | 84.3 | 133 | 135 | 29.6 | 69 | **NS** | **NS** |
| Alkalinity ($CaCO_3$) | mg/L | 23.3 | 22 | 68.6 | 132 | 132 | 15.9 | 75 | **NS** | **NS** |
| Total Suspended Solids | mg/L | <3 | 2 | 14 | 14 | <3.0 | 5 | <3 | **NS** | **NS** |
| Total Dissolved Solids (calculated) | mg/L | 35.1 | 35 | 99.4 | 149 | 158 | 20.5 | 133 | **NS** | **NS** |
| **Major Ions** | | | | | | | | | | |
| Carbonate ($CO_3$) | mg/L | <5 | --- | <5 | <5.0 | <5.0 | <5 | <5 | **NS** | **NS** |
| Bicarbonate ($HCO_3$) | mg/L | 28.4 | 27 | 83.7 | 160 | 161 | 19.4 | 88 | **NS** | **NS** |
| Sodium (Na) | mg/L | 2.7 | 2 | 4.9 | 5.7 | 6.8 | <1 | 8 | **NS** | **NS** |
| Potassium (K) | mg/L | 1.17 | 1 | 0.55 | 0.9 | 0.95 | <0.5 | 1.3 | **NS** | **NS** |
| Calcium (Ca) | mg/L | 7.37 | 6 | 22.5 | 36.3 | 35.6 | 7.75 | 21 | **NS** | **NS** |
| Magnesium (Mg) | mg/L | 2.43 | 2 | 6.84 | 10.2 | 11.3 | 2.5 | 7 | **NS** | **NS** |
| Chloride (Cl) | mg/L | <0.5 | 0.5 | <0.5 | <0.50 | <0.50 | <0.5 | 1 | **NS** | **120[d]/640[e]** |
| Sulphate ($SO_4$) | mg/L | 7.41 | 7 | 23.4 | 16.2 | 24.4 | 0.74 | 8 | **NS** | **NS** |
| **Nutrients** | | | | | | | | | | |
| Nitrite ($NO_2$-N) | mg/L | <0.05 | <0.003 | <0.05 | <0.050 | <0.050 | <0.05 | <0.05 | **NS** | **0.06** |
| Nitrate ($NO_3$ -N) | mg/L | <0.05 | 0.05 | <0.05 | <0.050 | <0.050 | <0.05 | <0.1 | **NS** | **3[d]/124[e]** |
| Nitrate + nitrite ($NO_3$ + $NO_2$ -N) | mg/L | <0.071 | 0.039 | <0.071 | <0.071 | <0.071 | <0.071 | <0.1 | **NS** | **NS** |
| Nitrogen - Ammonia ($NH_4$-N)*** | mg/L | <0.05 | 0.022 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | **NS** | **0.017[ph/T]** |
| Nitrogen - Kjeldahl (TKN) | mg/L | 0.49 | 0.42 | 1.52 | 1.61 | 0.86 | 1.47 | 1.6 | **NS** | **NS** |
| Total nitrogen (TKN + $NO_3$ + $NO_2$) | mg/L | ***0.49*** | ***0.46*** | ***1.52*** | --- | --- | ***1.47*** | ***1.6*** | **1.0[C]** | **NS** |
| Phosphorus, total | mg/L | --- | 0.023 | --- | ***0.067*** | 0.039 | --- | ***0.058*** | **0.05[C]** | **NS** |
| Dissolved Organic Carbon | mg/L | 9.7 | 8 | 23 | --- | --- | 30.1 | 30 | **NS** | **NS** |

**TABLE A-1 WATER QUALITY RESULTS**
Prosper Petroleum Ltd.
096-17 W4M

| **Sample Site** | | --- | --- | --- | --- | --- | --- | --- | **AENV Freshwater Aquatic Life^** | **CCME Water Quality Guidelines - Freshwater^^** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Name** | | Namur Lake | Namur Lake Summer | WB-1 | WB-2 | WB-3 | WB-4 | Within/Near Local Study Area | | |
| **Date** | **Unit** | Summer 2009** | Median 1972-2009** | Summer 2009** | 26-Aug-13 | 26-Aug-13 | Summer 2009** | Summer Median 1977-2009** | | |
| Easting | | --- | --- | --- | --- | --- | --- | --- | | |
| Northing | | --- | --- | --- | --- | --- | --- | --- | | |
| Sample Number | | --- | --- | --- | 16780130826001 | 16780130826003 | --- | --- | | |
| **Total Metals** | | | | | | | | | | |
| Aluminum (Al) | mg/L | <0.01 | 0.0097 | 0.064 | 0.025 | <0.020 | ***0.103*** | 0.014 | **NS** | **0.005/0.1[a]** |
| Antimony (Sb) | mg/L | <0.0004 | 0.000068 | <0.0004 | <0.00040 | <0.00040 | <0.0004 | 0.000045 | **NS** | **NS** |
| Arsenic (As) | mg/L | <0.0004 | 0.00036 | 0.00171 | 0.00147 | 0.00126 | <0.0004 | 0.00069 | **NS** | **0.005** |
| Barium (Ba) | mg/L | 0.019 | 0.019 | 0.0313 | 0.0354 | 0.033 | 0.0135 | 0.022 | **NS** | **NS** |
| Beryllium (Be) | mg/L | <0.001 | 0.000006 | <0.001 | <0.0010 | <0.0010 | <0.001 | <0.000012 | **NS** | **NS** |
| Bismuth (Bi) | mg/L | --- | 0.000002 | --- | <0.00020 | <0.00020 | --- | 0.000003 | **NS** | **NS** |
| Boron (B) | mg/L | <0.05 | 0.025 | <0.05 | 0.065 | 0.064 | <0.05 | 0.05 | **NS** | **NS** |
| Cadmium (Cd) | mg/L | <0.00005 | 0.000008 | <0.00005 | <0.00020 | <0.00020 | <0.00005 | 0.000008 | **NS** | **Hardness** |
| Chromium (Cr) | mg/L | <0.005 | <0.0001 | <0.005 | <0.00080 | <0.00080 | <0.005 | <0.0002 | **NS** | **0.0089[b]** |
| Cobalt (Co) | mg/L | <0.002 | 0.00003 | <0.002 | <0.00020 | <0.00020 | <0.002 | 0.0001 | **NS** | **NS** |
| Copper (Cu) | mg/L | <0.001 | 0.0006 | <0.001 | <0.0010 | <0.0010 | <0.001 | <0.001 | **Hardness[A]/0.007[C]** | **Hardness** |
| Iron (Fe) | mg/L | <0.01 | 0.02 | ***0.892*** | ***0.314*** | ***0.318*** | ***0.374*** | 0.27 | **NS** | **0.3** |
| Lead (Pb) | mg/L | <0.0001 | 0.0001 | <0.0001 | <0.00010 | <0.00010 | 0.00011 | 0.00007 | **NS** | **Hardness** |
| Manganese (Mn) | mg/L | <0.005 | 0.009 | 0.0412 | 0.0822 | 0.0457 | 0.0151 | 0.042 | **NS** | **NS** |
| Mercury (Hg) | mg/L | <0.0001 | <0.00002 | <0.0001 | <0.00010 | <0.00010 | <0.0001 | <0.0000007 | **0.000013[A]/0.000005[C]** | **0.000026*** |
| Molybdenum (Mo) | mg/L | <0.005 | 0.00024 | <0.005 | 0.00076 | 0.0005 | <0.005 | 0.00062 | **NS** | **0.073** |
| Nickel (Ni) | mg/L | <0.002 | 0.00066 | <0.002 | 0.00061 | 0.00054 | <0.002 | 0.00046 | **NS** | **Hardness** |
| Selenium (Se) | mg/L | <0.0004 | 0.0002 | <0.0004 | <0.00040 | <0.00040 | <0.0004 | <0.0001 | **NS** | **0.001** |
| Silver (Ag) | mg/L | <0.0001 | <0.000001 | ***0.00032*** | <0.00040 | <0.00040 | <0.0001 | 0.000004 | **NS** | **0.0001** |
| Thallium (Tl) | mg/L | --- | 0.000001 | --- | <0.00010 | <0.00010 | --- | 0.000002 | **NS** | **0.0008** |
| Strontium (Sr) | mg/L | <0.0001 | 0.041 | <0.0001 | 0.219 | 0.237 | <0.0001 | 0.097 | **NS** | **NS** |
| Tin (Sn) | mg/L | --- | --- | --- | <0.00040 | <0.00040 | --- | --- | **NS** | **NS** |
| Titanium (Ti) | mg/L | <0.001 | 0.0005 | 0.0014 | <0.0050 | <0.0050 | <0.001 | 0.0009 | **NS** | **NS** |
| Uranium (U) | mg/L | <0.0001 | 0.00001 | 0.00017 | 0.00036 | 0.00023 | 0.00134 | 0.0001 | **NS** | **NS** |
| Vanadium (V) | mg/L | <0.001 | <0.001 | <0.001 | <0.00050 | <0.00050 | <0.001 | 0.00041 | **NS** | **NS** |
| Zinc (Zn) | mg/L | <0.004 | 0.0017 | <0.004 | <0.0040 | <0.0040 | <0.004 | 0.0033 | **NS** | **0.03** |

**Notes:**
--- - not analyzed
NS - not specified
* - indicates value for Methylmercury; value for Inorganic Mercury = 0.026 µg/L
** - Dover Operating Corporation 2010 (Matrix Site Names "Namur Lake" reported as *WB-4* , "WB-4" reported as *WB-3* , and "WB-1" reported as *WB-10* on table A-1 in report)
*** - Nitrogen-ammonia guideline values derived using median field pH and temperature values (where appropriate)
[1] - guideline shown is most stringent value; refer to CCME summary table for DO guideline breakdown
[#] - refer to AENV, 1999 guidelines for further information
[A] - Acute Aquatic Life guideline
[C] - Chronic Aquatic Life guideline
[AA] - 1-day minimum, Acute Aquatic Life guideline
[CA] - 7-day mean, Chronic Aquatic Life guideline
[CC] - continuous concentration guideline, National Recommended Water Quality Criteria (USEPA, 2009)
a - guideline level is dependent on pH; 5 µg/L if pH <6.5; 100 µg/L if pH >6.5
b - indicates guideline level for Cr(VI); guideline level for Cr(III) = 8.9 µg/L
d - long term exposure
e - short term exposure
Hardness - guideline is dependent on hardness value; refer to relevant guidelines for further information
pH/T - most stringent value, guideline pH and temperature dependant, refer to CCME factsheet for guideline information
^ - *Alberta Environment Surface Water Quality Guidelines for use in Alberta* (AENV 1999)
^^ - *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (CCME, accessed on line on July 2012)
***Italics*** - indicates that values exceed specified guideline