

## **Attachment X.III. Sediment Chemistry**

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Sediment Chemistry Laboratory Results for Baker Lake, 2008 and 2009

Table X.III-1  
Historical Surficial Sediment Chemistry Data for Lakes in the Kiggavik Project Area, 1979-1991

| Parameter                | Units    | CCME<br>Sediment<br>Quality<br>Guidelines |                    | Willow Lake Sub-Basin |                    |             |                     |                      |                      |                      |                      |                            |           | Lower Lake Sub-Basin |               |            |              | Caribou Lake<br>Sub-Basin    |               | Boulder Lake<br>Sub-Basin | Judge Sissons Lake Sub-Basin |                      |           |                      | Skinny Lake<br>Sub-Basin |                |
|--------------------------|----------|-------------------------------------------|--------------------|-----------------------|--------------------|-------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------------|-----------|----------------------|---------------|------------|--------------|------------------------------|---------------|---------------------------|------------------------------|----------------------|-----------|----------------------|--------------------------|----------------|
|                          |          |                                           |                    | Felsenmeer<br>Lake    | Escarpment<br>Lake | Lin<br>Lake | Scotch Lake         |                      | Jaeger Lake          |                      | Pointer Lake         |                            |           | Willow<br>Lake       | Lunch<br>Lake | Shack Lake |              | Lower<br>Lake <sup>(c)</sup> | Ridge<br>Lake | Cirque<br>Lake            | Boulder Lake                 | Judge Sissons Lake   |           |                      |                          | Skinny<br>Lake |
|                          |          |                                           |                    | 1986                  | 1986               | 1986        | 1979                | 1988                 | 1979                 | 1988                 | 1979                 | 1988                       | 1991      | 1986                 | 1990          | 1990       | 1991         | 1990                         | 1986          | 1986                      | 1986                         | 1979                 | 1986      | 1988                 | 1991                     | 1986           |
|                          |          | ISQG <sup>(a)</sup>                       | PEL <sup>(b)</sup> | n = 1                 | n = 1              | n = 1       | n = 2               | n = 1                | n = 1                | n = 1                | n = 1                | n = 10                     | n = 4     | n = 3                | n = 1         | n = 2      | n = 2        | n = 3                        | n = 1         | n = 1                     | n = 1                        | n = 1                | n = 14    | n = 1                | n = 1                    | n = 1          |
| Physical Properties      |          |                                           |                    |                       |                    |             |                     |                      |                      |                      |                      |                            |           |                      |               |            |              |                              |               |                           |                              |                      |           |                      |                          |                |
| Loss on Ignition         | %        | -                                         | -                  | 10.3                  | 14.0/14.0          | 28          | -                   | -                    | -                    | 16.5                 | -                    | 8.5-12.7                   | 9.4-9.8   | 8.9                  | -             | -          | 21.2-21.5    | -                            | 13.0          | 18.2                      | 10.5                         | -                    | 2.4       | -                    | 1.8/1.8                  | 9.7            |
| Cation Exchange Capacity | meq/100g | -                                         | -                  | -                     | -                  | -           | -                   | -                    | -                    | 11.0/11.0            | -                    | 3.6-6.4                    | -         | -                    | -             | -          | -            | -                            | -             | -                         | -                            | -                    | -         | -                    | -                        | -              |
| Chemical Oxygen Demand   | %        | -                                         | -                  | 3.4                   | 3.6                | 6.7         | -                   | -                    | -                    | 1.75                 | -                    | 1.23-1.83                  | -         | 2.3                  | -             | -          | -            | -                            | 2.7           | 6.7                       | 4.3                          | -                    | 0.75/0.82 | -                    | -                        | 3.6            |
| Nutrients                |          |                                           |                    |                       |                    |             |                     |                      |                      |                      |                      |                            |           |                      |               |            |              |                              |               |                           |                              |                      |           |                      |                          |                |
| Total Kjeldahl Nitrogen  | µg/g dw  | -                                         | -                  | 2700                  | 1,000/1,400        | 8100        | -                   | -                    | -                    | 8600                 | -                    | 2900-4800                  | 390-3900  | 6600                 | -             | -          | 610-7400     | -                            | 6000          | 7700                      | 4800                         | -                    | 790       | -                    | 1560/1500                | 140            |
| Total Phosphorous        | µg/g dw  | -                                         | -                  | 1080                  | 1,860/1,930        | 1150        | -                   | -                    | -                    | 950                  | -                    | 820-930                    | 800-890   | 1210                 | -             | -          | 760-830      | -                            | 4700          | 1160                      | 830                          | -                    | 700       | -                    | 1060                     | 1260           |
| Total Organic Carbon     | %        | -                                         | -                  | -                     | -                  | -           | -                   | -                    | -                    | -                    | -                    | -                          | -         | -                    | 0.16-4.7      | 0.79-18.6  | -            | 4.2/5.2                      | -             | -                         | -                            | -                    | -         | -                    | -                        |                |
| Major Ions               |          |                                           |                    |                       |                    |             |                     |                      |                      |                      |                      |                            |           |                      |               |            |              |                              |               |                           |                              |                      |           |                      |                          |                |
| Calcium                  | mg/g dw  | -                                         | -                  | 2.5                   | 1.65/1.69          | 4.5         | -                   | -                    | -                    | 3.1                  | -                    | 2.7-3.0                    | 2.7-3     | 3.6                  | 1.76-3.9      |            | 4.5-5.3      | 4.5                          | 2.7           | 2.5                       | 1.94                         | -                    | 1.89      | -                    | 2.8                      | 2.1            |
| Magnesium                | mg/g dw  | -                                         | -                  | 6.2                   | 5.1/5.1            | 5.5         | -                   | -                    | -                    | 4.6                  | -                    | 3.5-4.6                    | 3.6-4.4   | 6.4                  | 0.88-6.2      | 1.42-4.1   | 4.2-5        | 2.1                          | 6.0           | 7.3                       | 3.1                          | -                    | 2.4       | -                    | 4.4                      | 3.7            |
| Potassium                | mg/g dw  | -                                         | -                  | 4.6                   | 4.1/5.0            | 3.4         | -                   | -                    | -                    | -                    | -                    | -                          | 1.83-2.40 | 3.1                  | 0.23-2.20     | 0.35-1.53  | 1.77-2.40    | 0.46                         | 4.1           | 6.2                       | 1.6                          | -                    | 1.15      | -                    | 2.1                      | 2.6            |
| Sodium                   | mg/g dw  | -                                         | -                  | 0.300                 | 0.430/0.440        | 0.270       | -                   | -                    | -                    | -                    | -                    | -                          | 0.20-0.25 | 0.360                | 0.24-0.36     | <0.01-0.21 | 0.3-0.4      | <0.01                        | 0.480         | 0.350                     | 0.170                        | -                    | 0.125     | -                    | 0.3                      | 0.300          |
| Metals and Metalloids    |          |                                           |                    |                       |                    |             |                     |                      |                      |                      |                      |                            |           |                      |               |            |              |                              |               |                           |                              |                      |           |                      |                          |                |
| Aluminum                 | mg/g dw  | -                                         | -                  | 19.3                  | 19.3/21.0          | 14.3        | -                   | -                    | -                    | 13.3                 | -                    | 10.1-14.2                  | 10.0-11.0 | 14.8                 | 1.76-17.0     | 3.0-11.9   | 11.1-13.8    | 4.5                          | 16.8          | 23.0                      | 6.3                          | -                    | 5.3       | -                    | 11.8                     | 12.5           |
| Arsenic                  | µg/g dw  | 5.9                                       | 17.0               | 4.5                   | <b>30/34</b>       | 2.0         | -                   | -                    | -                    | 3                    | -                    | 3.0-4.5                    | 2-3       | <b>6.0</b>           | <1-3          | 1-3        | <1-7         | <1                           | <b>60</b>     | -                         | 3.0                          | -                    | 2.0       | -                    | <b>12</b>                | 3.0            |
| Arsenic                  | µg/g ww  | -                                         | -                  | -                     | -                  | -           | 0.86 <sup>(d)</sup> | -                    | 2.32 <sup>(d)</sup>  | -                    | 1.5 <sup>(d)</sup>   | -                          | -         | -                    | -             | -          | -            | -                            | -             | -                         | -                            | 4.48 <sup>(d)</sup>  | -         | -                    | -                        | -              |
| Barium                   | µg/g dw  | -                                         | -                  | 330                   | 440/440            | 350         | -                   | -                    | -                    | 280                  | -                    | 157-210                    | 164-195   | 240                  | 20-220        | 30-290     | 230-270      | 60                           | 620           | 550                       | 158                          | -                    | 93        | -                    | 154                      | 320            |
| Beryllium                | µg/g dw  | -                                         | -                  | <1                    | 2/2                | 1           | -                   | -                    | -                    | -                    | -                    | -                          | <1-<2     | 1                    | <0.5-2.0      | <0.5-1.5   | 1            | <0.5                         | 2             | 2                         | <1                           | -                    | <1        | -                    | <1                       | 2              |
| Boron                    | µg/g dw  | -                                         | -                  | -                     | -                  | -           | -                   | -                    | -                    | -                    | -                    | -                          | 15        | -                    | 14            | <2-22      | 15-25        | <2                           | -             | -                         | -                            | -                    | -         | -                    | 20                       | -              |
| Cadmium                  | µg/g dw  | 0.6                                       | 3.5                | <1                    | -                  | <1          | <0.5                | -                    | <0.5                 | 0.25                 | <0.5                 | 0.15-0.20                  | <0.5-<1   | <1                   | <0.5          | <0.5       | <0.5-1       | <0.5                         | -             | <1                        | <1                           | <0.5                 | <1        | -                    | <0.5                     | -              |
| Chromium                 | µg/g dw  | 37.3                                      | 90.0               | <b>46</b>             | <b>44/47</b>       | 34          | <b>85.0</b>         | -                    | <b>100.0</b>         | 34                   | <b>85.5</b>          | 27-36                      | 27-35     | <b>48</b>            | <b>40-44</b>  | 12-31      | <b>33-40</b> | 13                           | <b>52</b>     | <b>63</b>                 | 19                           | <b>82.5</b>          | 16        | -                    | 36                       | 26.0           |
| Cobalt                   | µg/g dw  | -                                         | -                  | 7                     | 15/17              | 3           | -                   | -                    | -                    | 6                    | -                    | 5-6                        | 4-5       | 8                    | 1.0-7.5       | 1.5-5.5    | 6            | <0.5                         | 10            | 7                         | 2                            | -                    | 2         | -                    | 9                        | 6              |
| Copper                   | µg/g dw  | 35.7                                      | 197                | 23                    | <b>34/36</b>       | <b>63</b>   | 22.5                | -                    | 15.0                 | 29                   | 18                   | 14-25                      | 18-22     | 16                   | 10-25         | 2.0-26     | 25-29        | 5.5                          | <b>39</b>     | <b>59</b>                 | 17                           | 14.4                 | 4         | -                    | 14                       | 29             |
| Iron                     | mg/g dw  | -                                         | -                  | 22                    | 92/94              | 11.8        | -                   | -                    | -                    | 9.3                  | -                    | 9.6-12.1                   | 9.4-10.5  | 2.7                  | 3-20          | 5-19       | 13.9-17      | 6                            | 85            | 20                        | 9.1                          | -                    | 11.5      | -                    | 32                       | 3.1            |
| Lead                     | µg/g dw  | 35.0                                      | 91.3               | 16                    | 14/16              | 18          | <5                  | -                    | <5.0                 | 12.8                 | <5                   | 8.8-12.0                   | 10-12     | 12                   | 3-20          | 5-19       | 11-13        | 6                            | 14            | 20                        | 10                           | <5                   | 4         | -                    | 10                       | 14             |
| Manganese                | µg/g dw  | -                                         | -                  | 220                   | 640/670            | 120         | -                   | -                    | -                    | 147                  | -                    | 108-136                    | 111-132   | 220                  | 32-194        | 43-134     | 163-195      | 77                           | 700           | 280                       | 107                          | -                    | 119       | -                    | 500                      | 280            |
| Mercury                  | µg/g dw  | 0.17                                      | 0.486              | 0.04/0.05             | 0.06               | 0.06        | 0.027               | -                    | 0.0060               | 0.060                | 0.014                | <0.02-0.08                 | <0.02     | 0.02                 | <0.02         | <b>1-3</b> | <0.02        | <1                           | 0.05          | 0.06                      | 0.03                         | 0.02                 | <0.01     | -                    | <0.02                    | 0.11           |
| Molybdenum               | µg/g dw  | -                                         | -                  | <2                    | 4/4                | <2          | -                   | -                    | -                    | -                    | -                    | -                          | <1-<2     | <2                   | 2.5-3.0       | 2.5-4.5    | <1           | 3.0                          | 6             | 2                         | <2                           | -                    | <2        | -                    | 2                        | <2             |
| Nickel                   | µg/g dw  | -                                         | -                  | 27                    | 26/28              | 29          | -                   | -                    | -                    | 24                   | -                    | 17-22                      | 18-22     | 26                   | 9.0-29        | 6.0-29     | 27-33        | 9.5                          | 32            | 42                        | 13                           | -                    | 8         | -                    | 26                       | 16             |
| Selenium                 | µg/g dw  | -                                         | -                  | <0.5                  | <0.5/<1            | <0.5        | -                   | -                    | -                    | <0.5                 | -                    | <0.5                       | <1-<2     | <0.5                 | <0.5          | <0.5       | <1-1         | <0.5                         | <0.5          | -                         | <0.5                         | -                    | <0.5      | -                    | <1                       | <0.5           |
| Selenium                 | µg/g ww  | -                                         | -                  | -                     | -                  | -           | 0.09 <sup>(d)</sup> | -                    | 0.020 <sup>(d)</sup> | -                    | 0.052 <sup>(d)</sup> | -                          | -         | -                    | -             | -          | -            | -                            | -             | -                         | -                            | 0.034 <sup>(d)</sup> | -         | -                    | -                        | -              |
| Silver                   | µg/g dw  | -                                         | -                  | -                     | -                  | -           | -                   | -                    | -                    | -                    | -                    | -                          | <0.5      | -                    | <0.5          | <0.5       | <0.5         | <0.5                         | -             | -                         | -                            | -                    | -         | -                    | <0.5                     | -              |
| Strontium                | µg/g dw  | -                                         | -                  | 24                    | 18/20              | 23          | -                   | -                    | -                    | 84                   | -                    | 85-98                      | 80-93     | 29                   | 19.5-103      | 28-88      | 81-96        | 33                           | 20            | 18                        | 13                           | -                    | 12        | -                    | 108                      | 14             |
| Tellurium                | µg/g ww  | -                                         | -                  | -                     | -                  | -           | -                   | -                    | <0.1 <sup>(d)</sup>  | -                    | -                    | -                          | -         | -                    | -             | -          | -            | -                            | -             | -                         | -                            | -                    | -         | -                    | -                        | -              |
| Titanium                 | µg/g dw  | -                                         | -                  | -                     | -                  | -           | -                   | -                    | -                    | -                    | -                    | -                          | 340-400   | -                    | 60-470        | 105-310    | 320-450      | 240                          | -             | -                         | -                            | -                    | -         | -                    | 450                      | -              |
| Uranium                  | µg/g dw  | -                                         | -                  | -                     | -                  | 4.2         | 2.8-3.2             | 4.4                  | -                    | 4.6                  | 1.1-4                | 3.0-4.3                    | 3.2-3.6   | 4.1                  | 1.2-6.0       | 1.2-4.7    | 4-4.7        | 2.0                          | -             | -                         | 2.6                          | <0.5-4.8             | 2.3       | 5.8                  | 5.3                      | 7.2            |
| Vanadium                 | µg/g dw  | -                                         | -                  | -                     | -                  | -           | -                   | -                    | -                    | -                    | -                    | -                          | 21-26     | -                    | 5.0-36        | 7.5-25     | 25-31        | 14.0                         | -             | -                         | -                            | -                    | -         | -                    | 31                       | -              |
| Zinc                     | µg/g dw  | 123                                       | 315                | 56                    | 96/99              | 78          | -                   | -                    | -                    | 60                   | -                    | 41-69                      | 52-62     | 69                   | 8-61          | 13-90      | 77-90        | 33                           | 73            | 83                        | 38                           | -                    | 25        | -                    | 45                       | 66             |
| Radionuclides            |          |                                           |                    |                       |                    |             |                     |                      |                      |                      |                      |                            |           |                      |               |            |              |                              |               |                           |                              |                      |           |                      |                          |                |
| Lead-210                 | Bq/g dw  | -                                         | -                  | -                     | -                  | 0.20        | <0.5-2.6            | 0.05 <sup>(e)</sup>  | -                    | 0.15 <sup>(e)</sup>  | 1.7-4.4              | <0.05-0.06                 | 0.13      | 0.06                 | 0.06          | 0.04-0.25  | 0.17-0.20    | 0.08                         | -             | -                         | 0.15                         | <0.5-5.7             | <0.03     | 0.07 <sup>(e)</sup>  | 0.05                     | 0.06           |
| Polonium-210             | Bq/g dw  | -                                         | -                  | -                     | -                  | -           | -                   | -                    | -                    | -                    | -                    | -                          | -         | -                    | 0.06-0.08     | 0.04-0.30  | -            | 0.10                         | -             | -                         | -                            | -                    | -         | -                    | -                        | -              |
| Polonium-220             | Bq/g dw  | -                                         | -                  | -                     | -                  | -           | -                   | 0.09 <sup>(e)</sup>  | -                    | 0.22 <sup>(e)</sup>  | -                    | 0.045-0.080 <sup>(f)</sup> | -         | -                    | -             | -          | -            | -                            | -             | -                         | -                            | -                    | -         | 0.095 <sup>(e)</sup> | -                        | -              |
| Radium-226               | Bq/g dw  | -                                         | -                  | -                     | -                  | 0.030       | 0.7-1               | 0.012 <sup>(e)</sup> | -                    | 0.027 <sup>(e)</sup> | 0.8-1.3              | 0.025-0.085 <sup>(f)</sup> | 0.07-0.08 | 0.035                | 0.03-0.11     | 0.02-0.10  | 0.09-0.11    | 0.03                         | -             | -                         | 0.018                        | 0.3-1.4              | 0.017     | 0.045 <sup>(e)</sup> | 0.09                     | 0.050          |
| Radium-228               | Bq/g dw  | -                                         | -                  | -                     | -                  | -           | -                   | <0.2                 | -                    | <0.2                 | -                    | <0.2                       | -         | -                    | -             | -          | -            | -                            | -             | -                         | -                            | -                    | -         | <0.2                 | -                        | -              |
| Thorium-228              | Bq/g dw  | -                                         | -                  | -                     | -                  | -           | 1.2-1.4             | 0.055 <sup>(e)</sup> | -                    | 0.080 <sup>(e)</sup> | 1.2-3.2              | 0.075 <sup>(e)</sup>       | -         | -                    | -             | -          | -            | -                            | -             | -                         | -                            | <0.3-2.4             | -         | 0.055 <sup>(e)</sup> | -                        | -              |
| Thorium-230              | Bq/g dw  | -                                         | -                  | -                     | -                  | 0.04        | 1.2                 | 0.03 <sup>(e)</sup>  | -                    | 0.05 <sup>(e)</sup>  | 0.8-1.9              | 0.11 <sup>(e)</sup>        | -         | 0.03                 | 0.20-0.04     | 0.02-0.04  | -            | <0.02                        | -             | -                         | 0.03                         | <0.3-1.6             | 0.01      | 0.040 <sup>(e)</sup> | -                        | 0.11           |
| Thorium-232              | Bq/g dw  | -                                         | -                  | -                     | -                  | -           | 1.4                 | 0.05 <sup>(e)</sup>  | -                    | 0.055 <sup>(e)</sup> | 1.3-2.9              | 0.065 <sup>(e)</sup>       | -         | 0.063                | -             | -          | -            | -                            | -             | -                         | 0.042                        | <0.3-1.7             | 0.061     | 0.011 <sup>(e)</sup> | -                        | 0.084          |

Source: BEAK 1990, BEAK 1992b.

Note: Duplicate entries for single station represent values of laboratory replicates.

Values greater than or equal to ISQGs are bolded.

Values greater than or equal to PELs are bolded and underlined.

Non-detect values that have detection limits that are greater than guidelines are italicized.

<sup>(a)</sup> = ISQG = Interim Freshwater Sediment Quality Guidelines (CCME 2002).

<sup>(b)</sup> = PEL = Probable Effect Levels (CCME 2002).

<sup>(c)</sup> = Sampling location was 2 km upstream of Lower Lake.

<sup>(d)</sup> = Concentrations were reported in wet weight; moisture content was not reported and therefore the concentrations could not be converted to dry weight.

<sup>(e)</sup> = Urangesellschaft (1991) reported mean for several stations and duplicate samples; sample size was not reported. The authors substituted half of the detection limit for values less than the detection limit when calculating the mean values.

<sup>(f)</sup> = Range of means from several stations and duplicate samples; sample size was not reported (Beak 1990).

CCME = Canadian Council of Ministers of the Environment; n = number of samples analyzed; % = percentage; meq/100 g = milliequivalents per 100 grams; µg/g dw = micrograms per gram dry weight; µg/g ww = microgram per gram in wet weight; mg/g dw = milligrams per gram in dry weight; Bq/g dw = Becquerels per gram in dry weight;

< = less than; - = no data collected.

Table X.III-2  
Historical Sediment Chemistry Data by Size Fraction or Depth Fraction for Lakes in the Kiggavik Project Area, 1979-1991

| Parameter           | Units | CCME<br>Sediment<br>Quality<br>Guidelines |  | Willow Lake Sub-Basin |                     |                    |        |                    |        |             |       |                                  |                                    |                    |                       |                     |        |                     |        |                     |        |                     |        |                     |        |                     |        |                   |       |                    |       |                    |       |                    |       |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|                     |       |                                           |  | Scotch Lake           |                     | Scotch Lake<br>1-A |        | Scotch Lake<br>1-B |        | Jaeger Lake |       | Pointer Lake                     |                                    | Pointer Lake 2     |                       | Pointer Lake<br>3-A |        | Pointer Lake<br>3-B |        | Pointer Lake<br>4-A |        | Pointer Lake<br>4-B |        | Pointer Lake<br>5-A |        | Pointer Lake<br>5-B |        | Pointer Lake<br>1 |       | Pointer Lake<br>2A |       | Pointer Lake<br>2B |       | Pointer Lake<br>2C |       |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                     |       |                                           |  | Surface<br>n = 10     | Subsurface<br>n = 7 | Top                | Bottom | Top                | Bottom | Whole       | Fines | Surface <sup>(c)</sup><br>n = 10 | Subsurface <sup>(d)</sup><br>n = 7 | Top <sup>(e)</sup> | Bottom <sup>(f)</sup> | Top                 | Bottom | Top                 | Bottom | Top                 | Bottom | Top                 | Bottom | Top                 | Bottom | Top                 | Bottom | Whole             | Fines | Whole              | Fines | Whole              | Fines | Whole              | Fines |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                     |       |                                           |  | ISQG <sup>(a)</sup>   | PEL <sup>(b)</sup>  | 1979               |        | 1979               |        | 1979        |       | Jul-88                           |                                    | 1979               |                       | 1979                |        | 1979                |        | 1979                |        | 1979                |        | 1979                |        | 1979                |        | 1979              |       | Jul-88             |       | Jul-88             |       | Jul-88             |       | Jul-88 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Physical Properties |       |                                           |  |                       |                     |                    |        |                    |        |             |       |                                  |                                    |                    |                       |                     |        |                     |        |                     |        |                     |        |                     |        |                     |        |                   |       |                    |       |                    |       |                    |       |        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Table X.III-2  
Historical Sediment Chemistry Data by Size Fraction or Depth Fraction for Lakes in the Kiggavik Project Area, 1979-1991

| Parameter                | Units     | CCME Sediment Quality Guidelines |                    | Judge Sissons Lake Sub-Basin |                      |                  |         |                  |         |                  |         |                  |         |                  |         |                  |         |                  |         |              |        |                  |        |                  |         |                  |         |                  |         |                  |         |                  |         |
|--------------------------|-----------|----------------------------------|--------------------|------------------------------|----------------------|------------------|---------|------------------|---------|------------------|---------|------------------|---------|------------------|---------|------------------|---------|------------------|---------|--------------|--------|------------------|--------|------------------|---------|------------------|---------|------------------|---------|------------------|---------|------------------|---------|
|                          |           |                                  |                    | Sissons Lake                 |                      | Sissons Lake A-A |         | Sissons Lake A-B |         | Sissons Lake B-A |         | Sissons Lake B-B |         | Sissons Lake C-A |         | Sissons Lake C-B |         | Sissons Lake D-A |         | Sissons Lake |        | Sissons Lake G-A |        | Sissons Lake G-B |         | Sissons Lake H-A |         | Sissons Lake H-B |         | Sissons Lake I-A |         | Sissons Lake I-B |         |
|                          |           |                                  |                    | Surface<br>n = 10            | Subsurface<br>n = 7  | Top              | Bottom  | Top              | Bottom  | Top              | Bottom  | Top              | Bottom  | Top              | Bottom  | Top              | Bottom  | Top              | Bottom  | Top          | Bottom | Top              | Bottom | Top              | Bottom  | Top              | Bottom  | Top              | Bottom  | Top              | Bottom  | Top              | Bottom  |
|                          |           | ISQG <sup>(a)</sup>              | PEL <sup>(b)</sup> | 1979                         |                      | 1979             |         | 1979             |         | 1979             |         | 1979             |         | 1979             |         | 1979             |         | 1979             |         | 1979         |        | 1979             |        | 1979             |         | 1979             |         | 1979             |         | 1979             |         | 1979             |         |
| Physical Properties      |           |                                  |                    |                              |                      |                  |         |                  |         |                  |         |                  |         |                  |         |                  |         |                  |         |              |        |                  |        |                  |         |                  |         |                  |         |                  |         |                  |         |
| Loss-on-ignition         | %         | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Cation Exchange Capacity | meq/100 g | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Chemical Oxygen Demand   | %         | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Nutrients                |           |                                  |                    |                              |                      |                  |         |                  |         |                  |         |                  |         |                  |         |                  |         |                  |         |              |        |                  |        |                  |         |                  |         |                  |         |                  |         |                  |         |
| Total Kjeldahl Nitrogen  | µg/g dw   | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Total Phosphorous        | µg/g dw   | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Major Ions               |           |                                  |                    |                              |                      |                  |         |                  |         |                  |         |                  |         |                  |         |                  |         |                  |         |              |        |                  |        |                  |         |                  |         |                  |         |                  |         |                  |         |
| Calcium                  | mg/g dw   | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Magnesium                | mg/g dw   | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Metals and Metalloids    |           |                                  |                    |                              |                      |                  |         |                  |         |                  |         |                  |         |                  |         |                  |         |                  |         |              |        |                  |        |                  |         |                  |         |                  |         |                  |         |                  |         |
| Aluminum                 | mg/g dw   | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Arsenic                  | µg/g dw   | 5.9                              | 17.0               | 4.48 <sup>(g)</sup>          | 2.32 <sup>(g)</sup>  | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Arsenic                  | µg/g ww   | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Barium                   | µg/g dw   | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Cadmium                  | µg/g dw   | 0.6                              | 3.5                | <0.5                         | <0.5                 | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Chromium                 | µg/g dw   | 37.3                             | 90.0               | 82.5                         | 73.2                 | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Cobalt                   | µg/g dw   | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Copper                   | µg/g dw   | 35.7                             | 197                | 14.4                         | 15.0                 | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Iron                     | mg/g dw   | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Lead                     | µg/g dw   | 35.0                             | 91.3               | <5.0                         | <5.0                 | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Manganese                | µg/g dw   | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Mercury                  | µg/g dw   | 0.17                             | 0.486              | 0.0174                       | 0.0170               | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Nickel                   | µg/g dw   | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Selenium                 | µg/g dw   | -                                | -                  | 0.034 <sup>(g)</sup>         | 0.043 <sup>(g)</sup> | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Selenium                 | µg/g ww   | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Strontium                | µg/g dw   | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Tellurium                | µg/g ww   | -                                | -                  | <0.1 <sup>(g)</sup>          | <0.1 <sup>(g)</sup>  | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Uranium                  | µg/g dw   | -                                | -                  | 2.0 <sup>(h)</sup>           | 3.0 <sup>(h)</sup>   | 3.4/1.8          | 3.8/2.2 | 3.6/2.6          | 1.6/0.8 | 1.5/0.2          | 2.8/1.2 | 0.8/0.4          | 7.6/1.6 | 0.8/0.4          | 1.8/1.6 | <0.5/0.8         | 1.2/1.6 | 1/0.4            | 3.3/2.4 | 0.8          | 0.94   | 1.9              | 2.2    | 1.6/0.2          | 3.2/0.2 | 2.8/1.4          | 2.8/0.8 | 4.8/2.2          | 3.4/1.2 | 2.8/0.6          | 2.4/1.2 | 2.6/0.8          | 4.8/1.0 |
| Zinc                     | µg/g dw   | 123                              | 315                | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Radionuclides            |           |                                  |                    |                              |                      |                  |         |                  |         |                  |         |                  |         |                  |         |                  |         |                  |         |              |        |                  |        |                  |         |                  |         |                  |         |                  |         |                  |         |
| Lead-210                 | Bq/g dw   | -                                | -                  | 0.051 <sup>(h)</sup>         | 0.035 <sup>(h)</sup> | <0.5             | <0.5    | 0.7              | 0.9     | 0.7              | <0.5    | <0.5             | <0.5    | 1.3              | 0.5     | 1.4              | 0.8     | 5.7              | 4.6     | 2.3          | 2.2    | 3.2              | <0.5   | 0.9              | 0.7     | 0.7              | <0.5    | <0.5             | 1.1     | <0.5             | 1       | 1.3              | <0.5    |
| Polonium-220             | Bq/g dw   | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Radium-226               | Bq/g dw   | -                                | -                  | 0.031 <sup>(h)</sup>         | 0.032 <sup>(h)</sup> | 0.7              | 0.7     | 0.7              | 0.8     | 0.7              | 0.7     | 0.5              | 0.7     | 0.8              | 1       | 0.7              | 1.1     | 1.3              | 2       | 1.4          | 0.9    | 1.4              | 0.4    | 0.3              | 0.9     | 0.9              | 0.8     | 1.1              | 0.6     | 0.6              | 0.8     | 0.7              | 0.8     |
| Radium-228               | Bq/g dw   | -                                | -                  | -                            | -                    | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -                | -       | -            | -      | -                | -      | -                | -       | -                | -       | -                | -       | -                | -       | -                |         |
| Thorium-228              | Bq/g dw   | -                                | -                  | 0.040 <sup>(h)</sup>         | 0.051 <sup>(h)</sup> | 1.4              | 1.5     | 1.5              | 1.6     | <0.3             | 2.5     | 0.5              | 0.9     | 2.4              | 1.7     | 1.6              | 1.3     | <0.3             | <0.3    | 0.9          | <0.3   | <0.3             | 1.3    | 1.1              | 1.9     | 1.6              | 1       | 1.7              | 2       | 1.4              | 1.6     | 0.6              | 1.7     |
| Thorium-230              | Bq/g dw   | -                                | -                  | 0.027 <sup>(h)</sup>         | 0.034 <sup>(h)</sup> | 0.9              | 0.8     | 1                | 1       | <0.3             | 1       | <0.3             | 0.8     | 0.7              | 1.2     | 0.8              | 0.8     | <0.3             | <0.3    | 0.6          | <0.3   | <0.3             | 1.2    | 1.1              | 1.4     | 1.6              | 0.5     | 1.4              | 1.7     | 1.1              | 1.2     | 0.5              | 1       |
| Thorium-232              | Bq/g dw   | -                                | -                  | 0.036 <sup>(h)</sup>         | 0.045 <sup>(h)</sup> | 1.3              | 1.1     | 1.5              | 1.6     | <0.3             | 1       | 0.5              | 0.9     | 1.7              | 1.2     | 1.3              | 1.3     | <0.3             | <0.3    | 0.9          | <0.3   | <0.3             | 1.4    | 1.1              | 1.7     | 1.6              | 1       | 1.7              | 2.2     | 1                | 1.6     | 0.6              | 1.6     |

Source: BEAK 1990, BEAK 1992b.

Note: Duplicate entries for single stations represent values of laboratory replicates.

Sissons Lake in historical data refers to Judge Sissons Lake in recent surveys.

Values greater than or equal to ISQGs are bolded.

Values greater than or equal to PELs are bolded and underlined.

Non-detect values that have detection limits that are greater than guidelines are italicized.

<sup>(a)</sup> = ISQG = Interim Freshwater Sediment Quality Guidelines (CCME 2002).

<sup>(b)</sup> = PEL = Probable Effect Levels (CCME 2002).

<sup>(c)</sup> = Sample collection from top 3 cm in core.

<sup>(d)</sup> = Sample collected from 10 - 13 cm below core surface.

<sup>(e)</sup> = Sample collected from surface of sediment.

<sup>(f)</sup> = Sample collected from 10 cm deep in sediment.

<sup>(g)</sup> = Concentrations were reported in wet weight; moisture content was not reported and therefore the concentrations could not be converted to dry weight.

<sup>(h)</sup> = Mean values from several stations and duplicate samples; one station sampled in duplicate in Scotch Lake. Values below detection were assumed to equal half of the detection limit.

CCME = Canadian Council of Ministers of the Environment; % = percentage; meq/100 g = milliequivalents per 100 grams; µg/g dw = micrograms per gram dry weight; µg/g ww = microgram per gram in wet weight; mg/g dw = milligrams per gram in dry weight; Bq/g dw = Becquerels per gram in dry weight; - = no data collected;

n = number of samples analyzed; < = less than.

Table X.III-3  
Sediment Chemistry for Lakes in the Kiggavik Project Area, Fall 2007

| Parameter                | Units   | CCME Sediment<br>Quality<br>Guidelines |                    | DL                       | Willow Lake Sub-Basin |           |              |           |             | Lower Lake Sub-Basin |           |             |           |            |           |            |           |
|--------------------------|---------|----------------------------------------|--------------------|--------------------------|-----------------------|-----------|--------------|-----------|-------------|----------------------|-----------|-------------|-----------|------------|-----------|------------|-----------|
|                          |         |                                        |                    |                          | Pointer Lake          |           | Sik Sik Lake |           | Willow Lake | End Grid Lake        |           | Andrew Lake |           | Shack Lake |           | Lower Lake |           |
|                          |         |                                        |                    |                          | PRL-SD1               | PRL-SD2   | SSL-SD1      | SSL-SD2   | WIL-SD2     | EGL-SD1              | EGL-SD2   | ANL-SD1     | ANL-SD2   | SHL-SD1    | SHL-SD2   | LWL-SD1    | LWL-SD2   |
|                          |         | ISQG <sup>(a)</sup>                    | PEL <sup>(b)</sup> |                          | 27-Aug-07             | 27-Aug-07 | 25-Aug-07    | 25-Aug-07 | 28-Aug-07   | 28-Aug-07            | 28-Aug-07 | 27-Aug-07   | 27-Aug-07 | 26-Aug-07  | 26-Aug-07 | 29-Aug-07  | 29-Aug-07 |
| Physical Properties      |         |                                        |                    |                          |                       |           |              |           |             |                      |           |             |           |            |           |            |           |
| Gravel                   | %       | -                                      | -                  | 0.01                     | 26.76                 | <0.01     | <0.01        | 11.43     | 0.04        | 3.38                 | 4.94      | 0.16        | 0.57      | 1.63       | 6.58      | <0.01      | <0.01     |
| Coarse Sand              | %       | -                                      | -                  | 0.01                     | 2.86                  | 0.04      | 0.06         | 0.08      | 0.13        | 30.61                | 20.18     | 49.03       | 36.2      | 26.41      | 31.56     | 0.02       | <0.01     |
| Fine Sand                | %       | -                                      | -                  | 0.01                     | 14.07                 | 2.79      | 1.05         | 1.88      | 31.79       | 48.96                | 49.57     | 42.22       | 44.81     | 57.07      | 50.79     | 5.17       | 1.52      |
| Silt                     | %       | -                                      | -                  | 0.01                     | 45.53                 | 86.08     | 69.81        | 69.18     | 55.48       | 14.54                | 21.18     | 6.57        | 14.84     | 12.32      | 8.67      | 77.1       | 79.72     |
| Clay                     | %       | -                                      | -                  | 0.01                     | 10.78                 | 11.09     | 29.09        | 17.42     | 12.56       | 2.51                 | 4.13      | 2.02        | 3.58      | 2.57       | 2.41      | 17.7       | 18.76     |
| Moisture                 | %       | -                                      | -                  | 0.01                     | 75.8                  | 63.9      | 62           | 59.4      | 44.7        | 32.4                 | 46.2      | 25          | 37.3      | 28.2       | 37.5      | 65.1       | 60.4      |
| Loss on Ignition         | %       | -                                      | -                  | 0.01                     | 8.87                  | 23.46     | 15.44        | 11.92     | 4.59        | 2.82                 | 7.23      | 0.53        | 2.42      | 3.14       | 2.38      | 12.96      | 14.91     |
| Nutrients                |         |                                        |                    |                          |                       |           |              |           |             |                      |           |             |           |            |           |            |           |
| Nitrite+Nitrate Nitrogen | µg/g dw | -                                      | -                  | 1                        | 10                    | 9         | 10           | 10        | 9           | 4                    | 8         | 5           | 4         | 5          | 4         | 7          | 10        |
| Ammonia as Nitrogen      | µg/g dw | -                                      | -                  | 1                        | 60                    | 70        | 140          | 90        | 30          | 10                   | 30        | 7           | 20        | 6          | 10        | 100        | 100       |
| Total Phosphorus         | µg/g dw | -                                      | -                  | 1                        | 940                   | 1040      | 990          | 1,000     | 710         | 290                  | 330       | 270         | 240       | 350        | 350       | 920        | 950       |
| Total Organic Carbon     | %       | -                                      | -                  | 0.01                     | 2.99                  | 6.06      | 5.71         | 4.27      | 1.15        | 0.95                 | 2.89      | <0.01       | 0.49      | 0.86       | 0.67      | 4.88       | 4.28      |
| Metals and Metalloids    |         |                                        |                    |                          |                       |           |              |           |             |                      |           |             |           |            |           |            |           |
| Aluminium                | µg/g dw | -                                      | -                  | 20                       | 14,100                | 18,900    | 29,400       | 22,400    | 10,300      | 6,000                | 7,200     | 4,100       | 4,100     | 5,000      | 4,300     | 19,500     | 18,000    |
| Arsenic                  | µg/g dw | 5.9                                    | 17.0               | 0.1                      | 6.5                   | 7.4       | 11           | 9.7       | 5.3         | 2                    | 2.8       | 1.3         | 2.4       | 2.7        | 1.5       | 7.8        | 7.3       |
| Barium                   | µg/g dw | -                                      | -                  | 0.5                      | 140                   | 310       | 360          | 290       | 180         | 62                   | 83        | 54          | 58        | 76         | 68        | 240        | 200       |
| Beryllium                | µg/g dw | -                                      | -                  | 0.1                      | 0.8                   | 1.1       | 1.6          | 1.3       | 0.9         | 0.3                  | 0.4       | 0.3         | 0.3       | 0.3        | 0.3       | 1.2        | 1         |
| Boron                    | µg/g dw | -                                      | -                  | 1                        | 9                     | 28        | 30           | 15        | <1          | <1                   | 1         | <1          | <1        | 8          | <1        | <1         | 2         |
| Cadmium                  | µg/g dw | 0.6                                    | 3.5                | 0.1                      | <0.1                  | 0.2       | 0.2          | 0.2       | <0.1        | <0.1                 | <0.1      | <0.1        | <0.1      | <0.1       | <0.1      | 0.2        | 0.2       |
| Chromium                 | µg/g dw | 37.3                                   | 90.0               | 0.5                      | 34                    | 37        | 39           | 37        | 23          | 10                   | 12        | 6.2         | 6.6       | 8.7        | 8.6       | 40         | 44        |
| Cobalt                   | µg/g dw | -                                      | -                  | 0.2                      | 5.2                   | 5.4       | 8.8          | 7.5       | 4.3         | 2.8                  | 2.8       | 1.8         | 1.5       | 3.1        | 1.9       | 8.9        | 7.8       |
| Copper                   | µg/g dw | 35.7                                   | 197                | 0.5                      | 19                    | 33        | 44           | 24        | 9.6         | 4.7                  | 20        | 21          | 130       | 120        | 8.9       | 19         | 25        |
| Iron                     | µg/g dw | -                                      | -                  | 20                       | 15,900                | 15,400    | 34,700       | 23,200    | 15000       | 6,200                | 8,800     | 5,700       | 5,200     | 5,500      | 5,800     | 27,600     | 26,400    |
| Lead                     | µg/g dw | 35.0                                   | 91.3               | 0.1                      | 10                    | 14        | 14           | 11        | 8.3         | 2.7                  | 4.7       | 4           | 13        | 11         | 4         | 11         | 11        |
| Manganese                | µg/g dw | -                                      | -                  | 0.2                      | 140                   | 160       | 390          | 260       | 150         | 60                   | 83        | 43          | 51        | 52         | 54        | 280        | 230       |
| Mercury                  | µg/g dw | 0.17                                   | 0.486              | 0.05                     | <0.05                 | <0.05     | <0.05        | <0.05     | <0.05       | <0.05                | <0.05     | <0.05       | <0.05     | <0.05      | <0.05     | <0.05      | <0.05     |
| Molybdenum               | µg/g dw | -                                      | -                  | 0.1                      | 0.6                   | 0.7       | 0.5          | 0.5       | 0.4         | <0.1                 | 0.4       | <0.1        | 0.2       | 0.2        | <0.1      | 0.5        | 0.6       |
| Nickel                   | µg/g dw | -                                      | -                  | 0.1                      | 19                    | 29        | 40           | 32        | 16          | 9.3                  | 12        | 7.1         | 11        | 14         | 7.2       | 34         | 32        |
| Selenium                 | µg/g dw | -                                      | -                  | 0.1                      | 0.5                   | 0.4       | 0.4          | 0.3       | <0.1        | <0.1                 | 0.2       | 0.3         | 1.2       | 1.3        | 0.4       | 0.2        | 0.2       |
| Silver                   | µg/g dw | -                                      | -                  | 0.1                      | <0.1                  | 0.2       | 0.6          | <0.1      | <0.1        | 0.8                  | <0.1      | <0.1        | <0.1      | <0.1       | <0.1      | <0.1       | <0.1      |
| Strontium                | µg/g dw | -                                      | -                  | 0.5                      | 170                   | 190       | 240          | 230       | 110         | 39                   | 49        | 38          | 37        | 44         | 50        | 200        | 170       |
| Titanium                 | µg/g dw | -                                      | -                  | 0.5 or 20 <sup>(c)</sup> | 450                   | 570       | 610          | 550       | 320         | 190                  | 240       | 150         | 170       | 200        | 180       | 670        | 660       |
| Uranium                  | µg/g dw | -                                      | -                  | 0.1                      | 1.9                   | 2.7       | 3.3          | 2.7       | 1.9         | 0.9                  | 1.9       | 0.8         | 0.7       | 1.1        | 0.9       | 2.9        | 2.5       |
| Vanadium                 | µg/g dw | -                                      | -                  | 0.1                      | 29                    | 34        | 45           | 41        | 22          | 11                   | 15        | 8.2         | 8.4       | 9.6        | 9.2       | 40         | 41        |
| Zinc                     | µg/g dw | 123                                    | 315                | 0.5                      | 62                    | 76        | 120          | 69        | 45          | 13                   | 70        | 74          | 440       | 410        | 29        | 83         | 100       |
| Radionuclides            |         |                                        |                    |                          |                       |           |              |           |             |                      |           |             |           |            |           |            |           |
| Lead-210                 | Bq/g dw | -                                      | -                  | 0.02                     | 0.07                  | 0.08      | 0.12         | 0.06      | 0.02        | <0.02                | 0.03      | <0.02       | 0.02      | <0.02      | <0.02     | 0.17       | 0.12      |
| Polonium-210             | Bq/g dw | -                                      | -                  | 0.005                    | 0.08                  | 0.08      | 0.09         | 0.09      | 0.06        | 0.02                 | 0.05      | 0.02        | 0.02      | 0.02       | 0.01      | 0.11       | 0.11      |
| Radium-226               | Bq/g dw | -                                      | -                  | 0.01                     | 0.06                  | 0.04      | 0.05         | 0.04      | 0.03        | <0.01                | 0.02      | 0.02        | 0.02      | 0.03       | <0.01     | 0.04       | 0.04      |
| Thorium-230              | Bq/g dw | -                                      | -                  | 0.02                     | 0.05                  | 0.06      | 0.06         | 0.05      | 0.04        | <0.02                | 0.02      | 0.03        | 0.02      | 0.04       | <0.02     | 0.07       | 0.07      |

Table X.III-3  
Sediment Chemistry for Lakes in the Kiggavik Project Area, Fall 2007

| Parameter                | Units   | CCME Sediment<br>Quality<br>Guidelines |                    | DL                       | Caribou Lake Sub-Basin |            |             |            |            |            |            |            | Skinny Lake Sub-Basin |
|--------------------------|---------|----------------------------------------|--------------------|--------------------------|------------------------|------------|-------------|------------|------------|------------|------------|------------|-----------------------|
|                          |         |                                        |                    |                          | Ridge Lake             |            | Cirque Lake |            | Crash Lake |            | Fox Lake   |            | Skinny Lake           |
|                          |         |                                        |                    |                          | RDL-SD1                | RDL-SD2    | CQL-SD1     | CQL-SD2    | CRL-SD1    | CRL-SD2    | FXL-SD1    | FXL-SD2    | SKL-SD1               |
|                          |         | ISQG <sup>(a)</sup>                    | PEL <sup>(b)</sup> |                          | 2-Sep-07               | 2-Sep-07   | 1-Sep-07    | 1-Sep-07   | 31-Aug-07  | 31-Aug-07  | 30-Aug-07  | 30-Aug-07  | 3-Sep-07              |
| Physical Properties      |         |                                        |                    |                          |                        |            |             |            |            |            |            |            |                       |
| Gravel                   | %       | -                                      | -                  | 0.01                     | 19.31                  | 0.44       | 1.24        | 2.34       | 8.65       | 6.52       | <0.01      | <0.01      | -                     |
| Coarse Sand              | %       | -                                      | -                  | 0.01                     | 0.83                   | 0.13       | 6.59        | 2.39       | 9.52       | 40.06      | 0.49       | 0.82       | -                     |
| Fine Sand                | %       | -                                      | -                  | 0.01                     | 10.85                  | 6.2        | 23.41       | 25.66      | 55.73      | 31.46      | 6.35       | 13.15      | -                     |
| Silt                     | %       | -                                      | -                  | 0.01                     | 47.19                  | 68.06      | 48.24       | 51.23      | 21.68      | 16.47      | 74.07      | 69.06      | -                     |
| Clay                     | %       | -                                      | -                  | 0.01                     | 21.82                  | 25.17      | 20.52       | 18.38      | 4.43       | 5.49       | 19.1       | 16.97      | -                     |
| Moisture                 | %       | -                                      | -                  | 0.01                     | 75.6                   | 76.2       | 75.7        | 67         | 41.6       | 39.9       | 73.1       | 59.8       | -                     |
| Loss on Ignition         | %       | -                                      | -                  | 0.01                     | 9.51                   | 13.31      | 11.81       | 12.53      | 5.98       | 5.86       | 13.52      | 13.55      | -                     |
| Nutrients                |         |                                        |                    |                          |                        |            |             |            |            |            |            |            |                       |
| Nitrite+Nitrate Nitrogen | µg/g dw | -                                      | -                  | 1                        | 20                     | 20         | 10          | 10         | 9          | 8          | 10         | 10         | 5                     |
| Ammonia as Nitrogen      | µg/g dw | -                                      | -                  | 1                        | 120                    | 100        | 120         | 70         | 40         | 80         | 80         | 60         | 120                   |
| Total Phosphorus         | µg/g dw | -                                      | -                  | 1                        | 2520                   | 1130       | 820         | 730        | 460        | 530        | 840        | 800        | 1420                  |
| Total Organic Carbon     | %       | -                                      | -                  | 0.01                     | 1.63                   | 2.47       | 4.06        | 3.03       | 2.64       | 2.13       | 4.61       | 4.34       | -                     |
| Metals and Metalloids    |         |                                        |                    |                          |                        |            |             |            |            |            |            |            |                       |
| Aluminium                | µg/g dw | -                                      | -                  | 20                       | 20,800                 | 24,200     | 32,000      | 17,100     | 13,900     | 21,500     | 20,100     | 20,500     | 21,200                |
| Arsenic                  | µg/g dw | 5.9                                    | 17.0               | 0.1                      | <u>31</u>              | <u>8.2</u> | <u>10</u>   | <u>5</u>   | <u>8.4</u> | <u>8.6</u> | <u>6.6</u> | 5.9        | <u>8.7</u>            |
| Barium                   | µg/g dw | -                                      | -                  | 0.5                      | 480                    | 440        | 470         | 280        | 230        | 320        | 280        | 290        | 330                   |
| Beryllium                | µg/g dw | -                                      | -                  | 0.1                      | 1.5                    | 1.6        | 2.3         | 1.3        | 0.8        | 1.2        | 1          | 1.1        | 2.3                   |
| Boron                    | µg/g dw | -                                      | -                  | 1                        | <1                     | 10         | 35          | 18         | <1         | 28         | 1          | 24         | <1                    |
| Cadmium                  | µg/g dw | 0.6                                    | 3.5                | 0.1                      | <0.1                   | <0.1       | 0.6         | <0.1       | 0.2        | 0.2        | 0.2        | <0.1       | 0.3                   |
| Chromium                 | µg/g dw | 37.3                                   | 90.0               | 0.5                      | 27                     | <u>43</u>  | <u>44</u>   | 31         | 31         | 27         | <u>40</u>  | <u>47</u>  | 29                    |
| Cobalt                   | µg/g dw | -                                      | -                  | 0.2                      | 7.1                    | 6.6        | 11          | 4.6        | 7.6        | 7.1        | 5.6        | 5.8        | 5.4                   |
| Copper                   | µg/g dw | 35.7                                   | 197                | 0.5                      | 29                     | <u>45</u>  | <u>58</u>   | <u>47</u>  | 12         | 32         | 30         | <u>44</u>  | <u>62</u>             |
| Iron                     | µg/g dw | -                                      | -                  | 20                       | 52,800                 | 26,800     | 24,500      | 14,400     | 15,900     | 16,700     | 12,300     | 12,600     | 32,900                |
| Lead                     | µg/g dw | 35.0                                   | 91.3               | 0.1                      | 12                     | 14         | 17          | 13         | 6.3        | 9.5        | 16         | 16         | 16                    |
| Manganese                | µg/g dw | -                                      | -                  | 0.2                      | 480                    | 280        | 330         | 160        | 140        | 170        | 140        | 150        | 200                   |
| Mercury                  | µg/g dw | 0.17                                   | 0.486              | 0.05                     | <0.05                  | <0.05      | <0.05       | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05                 |
| Molybdenum               | µg/g dw | -                                      | -                  | 0.1                      | 5.9                    | 2.9        | 8.2         | 2.5        | 1          | 1.4        | 0.7        | 0.4        | 1.7                   |
| Nickel                   | µg/g dw | -                                      | -                  | 0.1                      | 29                     | 33         | 48          | 23         | 24         | 30         | 31         | 32         | 23                    |
| Selenium                 | µg/g dw | -                                      | -                  | 0.1                      | 0.4                    | 0.5        | 0.9         | 0.3        | <0.1       | 0.2        | 0.3        | 0.3        | 0.8                   |
| Silver                   | µg/g dw | -                                      | -                  | 0.1                      | 0.2                    | 0.2        | 0.3         | <0.1       | 0.2        | <0.1       | <0.1       | <0.1       | 0.2                   |
| Strontium                | µg/g dw | -                                      | -                  | 0.5                      | 150                    | 140        | 160         | 110        | 70         | 99         | 140        | 120        | 99                    |
| Titanium                 | µg/g dw | -                                      | -                  | 0.5 or 20 <sup>(c)</sup> | 270                    | 340        | 410         | 310        | 180        | 360        | 380        | 390        | 230                   |
| Uranium                  | µg/g dw | -                                      | -                  | 0.1                      | 2.2                    | 2.5        | 5.6         | 2          | 1.6        | 2.2        | 2.1        | 2.2        | 5.5                   |
| Vanadium                 | µg/g dw | -                                      | -                  | 0.1                      | 34                     | 38         | 44          | 27         | 25         | 30         | 30         | 32         | 27                    |
| Zinc                     | µg/g dw | 123                                    | 315                | 0.5                      | 76                     | 100        | <u>150</u>  | <u>130</u> | 51         | 110        | 83         | <u>130</u> | <u>170</u>            |
| Radionuclides            |         |                                        |                    |                          |                        |            |             |            |            |            |            |            |                       |
| Lead-210                 | Bq/g dw | -                                      | -                  | 0.02                     | 0.1                    | 0.12       | 0.13        | 0.12       | 0.05       | 0.12       | 0.12       | 0.06       | 0.24                  |
| Polonium-210             | Bq/g dw | -                                      | -                  | 0.005                    | 0.08                   | 0.14       | 0.14        | 0.09       | 0.03       | 0.09       | 0.15       | 0.06       | 0.28                  |
| Radium-226               | Bq/g dw | -                                      | -                  | 0.01                     | 0.06                   | 0.04       | 0.07        | 0.03       | 0.04       | 0.05       | 0.04       | 0.04       | 0.1                   |
| Thorium-230              | Bq/g dw | -                                      | -                  | 0.02                     | 0.06                   | 0.06       | 0.09        | 0.05       | 0.04       | 0.04       | 0.03       | 0.05       | 0.09                  |

Note: Values greater than or equal to ISQGs are bolded.

Values greater than or equal to PELs are bolded and underlined.

Non-detect values that have detection limits that are greater than guidelines are italicized.

<sup>(a)</sup> = ISQG = Interim Freshwater Sediment Quality Guidelines (CCME 2002).

<sup>(b)</sup> = PEL = Probable Effect Levels (CCME 2002).

<sup>(c)</sup> = Detection limit for titanium was either 0.5 µg/g or 20 µg/g, depending on the sample.

CCME = Canadian Council of Ministers of the Environment; DL = detection limit; % = percentage; µg/g dw = micrograms per gram dry weight; Bq/g dw = Becquerels per gram in dry weight; - = no data collected;

Aug = August; Sep = September; < = less than.

Table X.III-4  
Sediment Chemistry for Lakes in the Kiggavik Project Area, Fall 2008

| Parameter               | Units   | CCME Sediment Quality Guidelines |             | DL                       | Willow Lake Sub-Basin |             |             |             |             |              |             |             |             |             |             |             |        |        |
|-------------------------|---------|----------------------------------|-------------|--------------------------|-----------------------|-------------|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|--------|--------|
|                         |         |                                  |             |                          | Pointer Lake          |             |             |             |             | Sik Sik Lake |             |             | Rock Lake   |             |             | Willow Lake |        |        |
|                         |         | PRL-001-F08                      | PRL-002-F08 |                          | PRL-003-F08           | PRL-004-F08 | PRL-005-F08 | SSL-001-F08 | SSL-002-F08 | SSL-003-F08  | ROL-001-F08 | ROL-002-F08 | ROL-003-F08 | WIL-001-F08 | WIL-002-F08 | WIL-003-F08 |        |        |
|                         |         | 2-Sep-08                         | 2-Sep-08    |                          | 3-Sep-08              | 2-Sep-08    | 3-Sep-08    | 4-Sep-08    | 4-Sep-08    | 4-Sep-08     | 4-Sep-08    | 4-Sep-08    | 4-Sep-08    | 5-Sep-08    | 5-Sep-08    | 5-Sep-08    |        |        |
| Physical Properties     |         |                                  |             |                          |                       |             |             |             |             |              |             |             |             |             |             |             |        |        |
| Gravel                  | %       | -                                | -           | 1                        | <1                    | <1          | <1          | <1          | <1          | 2.0          | -           | -           | 2.0         | -           | -           | <1          | -      | -      |
| Coarse Sand             | %       | -                                | -           | 1                        | 3.0                   | 1.0         | 20.0        | 4.0         | 1.0         | 1.0          | -           | -           | <1          | -           | -           | 10.0        | -      | -      |
| Fine Sand               | %       | -                                | -           | 1                        | 8.0                   | 13.0        | 61.0        | 59.0        | 44.0        | 1.0          | -           | -           | 1.0         | -           | -           | 32.0        | -      | -      |
| Silt                    | %       | -                                | -           | 1                        | 75.0                  | 80.0        | 16.0        | 33.0        | 49.0        | 67.0         | -           | -           | 85.0        | -           | -           | 51.0        | -      | -      |
| Clay                    | %       | -                                | -           | 1                        | 14.0                  | 6.0         | 2.0         | 4.0         | 6.0         | 29.0         | -           | -           | 11.0        | -           | -           | 6.0         | -      | -      |
| Moisture <sup>(d)</sup> | %       | -                                | -           | 0.5                      | 49.6                  | 58.5        | 36.5        | 46.9        | 47.7        | 54.4         | -           | -           | 58.9        | -           | -           | 34.8        | -      | -      |
| Moisture <sup>(e)</sup> | %       | -                                | -           | 0.5                      | 75.9                  | 62.3        | 43.5        | -           | -           | 60.1         | 55.8        | 57.3        | 60.3        | 73.2        | 52.9        | 46.2        | 41.1   | 47.5   |
| Nutrients               |         |                                  |             |                          |                       |             |             |             |             |              |             |             |             |             |             |             |        |        |
| Total Organic Carbon    | %       | -                                | -           | 0.1                      | 1.5                   | 6.8         | 1.5         | 2.0         | 3.6         | 7.3          | -           | -           | 6.8         | -           | -           | 1.9         | -      | -      |
| Major Ions              |         |                                  |             |                          |                       |             |             |             |             |              |             |             |             |             |             |             |        |        |
| Calcium                 | µg/g dw | -                                | -           | 1                        | 3,840                 | 3,710       | 2,410       | -           | -           | 5,290        | 5,870       | 4,520       | 5,230       | 4,520       | 4,370       | 3,000       | 3,860  | 2,940  |
| Magnesium               | µg/g dw | -                                | -           | 1                        | 4,870                 | 4,780       | 2,950       | -           | -           | 7,880        | 9,730       | 6,480       | 7,350       | 4,340       | 5,520       | 4,250       | 5,210  | 3,710  |
| Potassium               | µg/g dw | -                                | -           | 1                        | 3,810                 | 3,850       | 2,500       | -           | -           | 5,250        | 10,600      | 5,970       | 7,630       | 4,390       | 5,910       | 3,210       | 5,770  | 4,070  |
| Sodium                  | µg/g dw | -                                | -           | 1                        | 92                    | 59          | 60          | -           | -           | 71           | 200         | 110         | 220         | 85          | 110         | 54          | 150    | 90     |
| Sulphate                | µg/g dw | -                                | -           | 10                       | 940                   | 2,900       | 850         | -           | -           | 1,300        | 1,200       | 1,400       | 1,600       | 1,900       | 1,200       | 540         | 840    | 490    |
| Metals and Metalloids   |         |                                  |             |                          |                       |             |             |             |             |              |             |             |             |             |             |             |        |        |
| Aluminum                | µg/g dw | -                                | -           | 0.5 or 20 <sup>(c)</sup> | 16,000                | 16,000      | 9,000       | -           | -           | 24,100       | 39,900      | 21,500      | 30,200      | 17,300      | 22,800      | 13,100      | 21,400 | 14,300 |
| Antimony                | µg/g dw | -                                | -           | 0.2                      | <0.2                  | <0.2        | <0.2        | -           | -           | <0.2         | <0.2        | <0.2        | <0.2        | <0.2        | <0.2        | <0.2        | <0.2   | <0.2   |
| Arsenic                 | µg/g dw | 5.9                              | 17.0        | 0.1                      | 7.8                   | 6.4         | 3.5         | -           | -           | 9.4          | 12          | 8.8         | 12          | 10          | 9.6         | 5.5         | 7.4    | 5.6    |
| Barium                  | µg/g dw | -                                | -           | 0.5                      | 140                   | 220         | 130         | -           | -           | 310          | 360         | 250         | 320         | 320         | 270         | 180         | 200    | 170    |
| Beryllium               | µg/g dw | -                                | -           | 0.1                      | 0.9                   | 1           | 0.6         | -           | -           | 1.5          | 2           | 1.2         | 1.6         | 1           | 1.3         | 0.8         | 1      | 0.7    |
| Boron                   | µg/g dw | -                                | -           | 1                        | <1                    | <1          | <1          | -           | -           | <1           | 39          | 9           | 15          | <1          | 25          | 8           | <1     | <1     |
| Cadmium                 | µg/g dw | 0.6                              | 3.5         | 0.1                      | <0.1                  | 0.1         | <0.1        | -           | -           | 0.2          | 0.2         | 0.1         | 0.2         | 0.3         | 0.2         | <0.1        | 0.1    | <0.1   |
| Chromium                | µg/g dw | 37.3                             | 90.0        | 0.5                      | 39                    | 36          | 40          | -           | -           | 59           | 21          | 53          | 34          | 25          | 34          | 45          | 11     | 20     |
| Cobalt                  | µg/g dw | -                                | -           | 0.2                      | 5.7                   | 4.7         | 3           | -           | -           | 9.2          | 10          | 6.9         | 8.1         | 5.3         | 6.5         | 4.3         | 5.3    | 3.9    |
| Copper                  | µg/g dw | 35.7                             | 197.0       | 0.5                      | 13                    | 18          | 10          | -           | -           | 26           | 27          | 18          | 17          | 13          | 12          | 9           | 10     | 7.3    |
| Iron                    | µg/g dw | -                                | -           | 0.5 or 20 <sup>(c)</sup> | 17,300                | 13,900      | 7,000       | -           | -           | 32,800       | 26,000      | 19,100      | 29,200      | 22,900      | 22,700      | 12,400      | 16,100 | 13,400 |
| Lead                    | µg/g dw | 35.0                             | 91.3        | 0.1                      | 12.0                  | 13.0        | 6.8         | -           | -           | 15.0         | 16.0        | 12.0        | 18.0        | 13.0        | 14.0        | 8.9         | 10.0   | 7.7    |
| Manganese               | µg/g dw | -                                | -           | 0.5                      | 150                   | 140         | 78          | -           | -           | 500          | 320         | 200         | 320         | 360         | 240         | 150         | 200    | 160    |
| Molybdenum              | µg/g dw | -                                | -           | 0.1                      | 0.9                   | 0.7         | 0.4         | -           | -           | 0.5          | 0.6         | 0.6         | 0.8         | 1.0         | 0.7         | 0.4         | 0.3    | 0.5    |
| Nickel                  | µg/g dw | -                                | -           | 0.1                      | 20.0                  | 23.0        | 14.0        | -           | -           | 37.0         | 42.0        | 29.0        | 31.0        | 20.0        | 23.0        | 16.0        | 19.0   | 16.0   |
| Selenium                | µg/g dw | -                                | -           | 0.1                      | 0.2                   | 0.3         | 0.2         | -           | -           | 0.4          | 0.5         | 0.3         | 0.4         | 0.3         | 0.3         | 0.2         | 0.2    | 0.2    |
| Silver                  | µg/g dw | -                                | -           | 0.1                      | <0.1                  | <0.1        | <0.1        | -           | -           | 0.1          | <0.1        | <0.1        | 0.1         | <0.1        | <0.1        | 0.2         | <0.1   | <0.1   |
| Strontium               | µg/g dw | -                                | -           | 0.5                      | 190                   | 140         | 91          | -           | -           | 170          | 280         | 180         | 250         | 150         | 210         | 140         | 180    | 130    |
| Thallium                | µg/g dw | -                                | -           | 0.2                      | <0.2                  | <0.2        | <0.2        | -           | -           | <0.2         | 0.4         | <0.2        | 0.3         | <0.2        | <0.2        | <0.2        | <0.2   | <0.2   |
| Tin                     | µg/g dw | -                                | -           | 0.1                      | <0.1                  | 0.1         | 0.3         | -           | -           | 0.4          | 0.3         | 0.2         | 0.3         | 0.2         | 0.9         | 0.2         | 0.1    | 0.7    |
| Titanium                | µg/g dw | -                                | -           | 0.5                      | 510                   | 460         | 290         | -           | -           | 370          | 790         | 490         | 850         | 550         | 730         | 440         | 610    | 500    |
| Uranium                 | µg/g dw | -                                | -           | 0.1                      | 2.4                   | 2.6         | 1.4         | -           | -           | 4.2          | 3.9         | 2.8         | 3.3         | 2.5         | 2.7         | 1.8         | 2.1    | 1.4    |
| Vanadium                | µg/g dw | -                                | -           | 0.1                      | 28.0                  | 28.0        | 15.0        | -           | -           | 42.0         | 52.0        | 35.0        | 48.0        | 30.0        | 39.0        | 23.0        | 28.0   | 22.0   |
| Zinc                    | µg/g dw | 123                              | 315         | 0.5                      | 46                    | 49          | 31          | -           | -           | 65           | 71          | 59          | 83          | 69          | 65          | 42          | 49     | 77     |
| Radionuclides           |         |                                  |             |                          |                       |             |             |             |             |              |             |             |             |             |             |             |        |        |
| Lead-210                | Bq/g dw | -                                | -           | 0.02                     | 0.06                  | 0.06        | <0.02       | -           | -           | 0.04         | 0.07        | 0.05        | 0.06        | 0.22        | 0.05        | 0.02        | 0.02   | 0.03   |
| Polonium-210            | Bq/g dw | -                                | -           | 0.01                     | 0.08                  | 0.06        | 0.02        | -           | -           | 0.07         | 0.07        | 0.09        | 0.09        | 0.19        | 0.07        | 0.03        | 0.05   | 0.06   |
| Radium-226              | Bq/g dw | -                                | -           | 0.01                     | 0.03                  | 0.03        | 0.02        | -           | -           | 0.05         | 0.04        | 0.04        | 0.06        | 0.06        | 0.07        | 0.04        | 0.03   | 0.03   |
| Thorium-228             | Bq/g dw | -                                | -           | 0.02                     | 0.04                  | 0.05        | 0.04        | -           | -           | 0.10         | 0.06        | 0.06        | 0.10        | 0.03        | 0.10        | 0.03        | 0.06   | 0.06   |
| Thorium-230             | Bq/g dw | -                                | -           | 0.02                     | 0.03                  | 0.05        | 0.03        | -           | -           | 0.07         | 0.06        | 0.04        | 0.04        | 0.03        | 0.06        | 0.04        | 0.04   | 0.05   |
| Thorium-232             | Bq/g dw | -                                | -           | 0.02                     | 0.04                  | 0.06        | 0.02        | -           | -           | 0.07         | 0.11        | 0.06        | 0.10        | 0.07        | 0.10        | 0.04        | 0.06   | 0.04   |

Table X.III-4  
Sediment Chemistry for Lakes in the Kiggavik Project Area, Fall 2008

| Parameter               | Units   | CCME Sediment Quality Guidelines |                    | DL                       | Lower Lake Sub-Basin |             |             |               |             |             |             |             |             |             |          |          |
|-------------------------|---------|----------------------------------|--------------------|--------------------------|----------------------|-------------|-------------|---------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|----------|
|                         |         |                                  |                    |                          | Mushroom Lake        |             |             | End Grid Lake |             | Cigar Lake  | Lunch Lake  | Andrew Lake | Shack Lake  | Lower Lake  |          |          |
|                         |         | MSL-001-F08                      | MSL-002-F08        |                          | MSL-003-F08          | EGL-001-F08 | EGL-002-F08 | CGL-001-F08   | LUL-001-F08 | ANL-001-F08 | SHL-001-F08 | LWL-001-F08 | LWL-002-F08 | LWL-003-F08 |          |          |
|                         |         | ISQG <sup>(a)</sup>              | PEL <sup>(b)</sup> |                          | 4-Sep-08             | 4-Sep-08    | 4-Sep-08    | 3-Sep-08      | 4-Sep-08    | 26-Aug-08   | 27-Aug-08   | 2-Sep-08    | 3-Sep-08    | 5-Sep-08    | 5-Sep-08 | 8-Sep-08 |
| Physical Properties     |         |                                  |                    |                          |                      |             |             |               |             |             |             |             |             |             |          |          |
| Gravel                  | %       | -                                | -                  | 1                        | <1                   | <1          | 1.0         | 3.0           | -           | <1          | <1          | <1          | 2.0         | <1          | -        | -        |
| Coarse Sand             | %       | -                                | -                  | 1                        | 1.0                  | 36.0        | 27.0        | 36.0          | -           | 13.0        | 3.0         | 54.0        | 57.0        | 1.0         | -        | -        |
| Fine Sand               | %       | -                                | -                  | 1                        | 13.0                 | 53.0        | 45.0        | 52.0          | -           | 20.0        | 68.0        | 25.0        | 31.0        | 3.0         | -        | -        |
| Silt                    | %       | -                                | -                  | 1                        | 72.0                 | 10.0        | 24.0        | 8.0           | -           | 55.0        | 25.0        | 18.0        | 9.0         | 81.0        | -        | -        |
| Clay                    | %       | -                                | -                  | 1                        | 14.0                 | 1.0         | 3.0         | 1.0           | -           | 12.0        | 4.0         | 2.0         | 1.0         | 16.0        | -        | -        |
| Moisture <sup>(d)</sup> | %       | -                                | -                  | 0.5                      | 56.5                 | 32.9        | 55.2        | 33.3          | -           | 76.4        | 35.3        | 52.1        | 30.7        | 71.6        | -        | -        |
| Moisture <sup>(e)</sup> | %       | -                                | -                  | 0.5                      | 75.4                 | 49.9        | 59.6        | 33.0          | 68.6        | 86.2        | 38.1        | 58.3        | 61.7        | 72.9        | 24.3     | 65.2     |
| Nutrients               |         |                                  |                    |                          |                      |             |             |               |             |             |             |             |             |             |          |          |
| Total Organic Carbon    | %       | -                                | -                  | 0.1                      | 3.4                  | 0.9         | 3.6         | 2.0           | -           | 9.1         | 2.4         | 2.9         | 1.5         | 5.5         | -        | -        |
| Major Ions              |         |                                  |                    |                          |                      |             |             |               |             |             |             |             |             |             |          |          |
| Calcium                 | µg/g dw | -                                | -                  | 1                        | 3,680                | 2,030       | 2,110       | 1,800         | 3,170       | 2,890       | 2,540       | 1,800       | 2,270       | 5,980       | 1,620    | 4,030    |
| Magnesium               | µg/g dw | -                                | -                  | 1                        | 6,520                | 2,160       | 2,330       | 2,340         | 3,710       | 3,830       | 2,690       | 1,690       | 2,090       | 8,200       | 1,320    | 6,090    |
| Potassium               | µg/g dw | -                                | -                  | 1                        | 8,900                | 2,870       | 2,340       | 2,710         | 4,630       | 4,140       | 2,370       | 1,920       | 2,240       | 7,420       | 1,380    | 3,530    |
| Sodium                  | µg/g dw | -                                | -                  | 1                        | 120                  | 52          | 40          | 33            | 78          | 87          | 160         | 34          | 130         | 190         | 36       | 82       |
| Sulphate                | µg/g dw | -                                | -                  | 10                       | 1,900                | 840         | 1,200       | 570           | 2,600       | 5,000       | 760         | 1,100       | 1,300       | 2,300       | 140      | 1,300    |
| Metals and Metalloids   |         |                                  |                    |                          |                      |             |             |               |             |             |             |             |             |             |          |          |
| Aluminum                | µg/g dw | -                                | -                  | 0.5 or 20 <sup>(c)</sup> | 31,500               | 9,100       | 7,950       | 9,260         | 17,300      | 17,700      | 7,900       | 7,100       | 7,800       | 28,400      | 4,570    | 17,200   |
| Antimony                | µg/g dw | -                                | -                  | 0.2                      | <0.2                 | <0.2        | <0.2        | <0.2          | <0.2        | <0.2        | <0.2        | <0.2        | <0.2        | <0.2        | <0.2     | <0.2     |
| Arsenic                 | µg/g dw | 5.9                              | 17.0               | 0.1                      | 8.7                  | 3.4         | 2.5         | 2.4           | 5.8         | 3.4         | 2.1         | 1.8         | 2.1         | 9.8         | 1.8      | 6.3      |
| Barium                  | µg/g dw | -                                | -                  | 0.5                      | 230                  | 64          | 88          | 73            | 150         | 130         | 98          | 100         | 110         | 240         | 62       | 160      |
| Beryllium               | µg/g dw | -                                | -                  | 0.1                      | 2.2                  | 0.5         | 0.5         | 0.4           | 1           | 1           | 0.6         | 0.4         | 0.5         | 1.5         | 0.2      | 0.9      |
| Boron                   | µg/g dw | -                                | -                  | 1                        | 53                   | 22          | 24          | 20            | 10          | <1          | 15          | 5           | <1          | 31          | 10       | <1       |
| Cadmium                 | µg/g dw | 0.6                              | 3.5                | 0.1                      | 0.3                  | <0.1        | <0.1        | <0.1          | 0.2         | 0.2         | 0.1         | <0.1        | 0.1         | 0.2         | <0.1     | <0.1     |
| Chromium                | µg/g dw | 37.3                             | 90.0               | 0.5                      | 42                   | 46          | 66          | 35            | 34          | 23          | 34          | 37          | 68          | 35          | 51       | 54       |
| Cobalt                  | µg/g dw | -                                | -                  | 0.2                      | 7                    | 2.5         | 3.4         | 2.9           | 4.7         | 3.5         | 2.9         | 1.9         | 2.3         | 9.3         | 1.4      | 6.8      |
| Copper                  | µg/g dw | 35.7                             | 197.0              | 0.5                      | 40                   | 5.7         | 7.5         | 5.5           | 14          | 22          | 10          | 3.7         | 6           | 18          | 3        | 12       |
| Iron                    | µg/g dw | -                                | -                  | 0.5 or 20 <sup>(c)</sup> | 31,200               | 11,600      | 10,100      | 7,310         | 27,500      | 9,650       | 6,500       | 8,900       | 9,900       | 30,900      | 5,300    | 21,400   |
| Lead                    | µg/g dw | 35.0                             | 91.3               | 0.1                      | 15.0                 | 5.8         | 4.5         | 3.4           | 6.6         | 13.0        | 4.9         | 3.5         | 5.1         | 13.0        | 2.5      | 9.7      |
| Manganese               | µg/g dw | -                                | -                  | 0.5                      | 350                  | 120         | 120         | 72            | 180         | 120         | 74          | 110         | 130         | 330         | 55       | 220      |
| Molybdenum              | µg/g dw | -                                | -                  | 0.1                      | 1.5                  | 0.6         | 0.5         | 0.4           | 0.7         | 0.8         | 0.4         | 0.4         | 0.6         | 0.6         | 0.2      | 0.5      |
| Nickel                  | µg/g dw | -                                | -                  | 0.1                      | 29.0                 | 10.0        | 13.0        | 11.0          | 21.0        | 19.0        | 13.0        | 7.9         | 11.0        | 34.0        | 5.2      | 25.0     |
| Selenium                | µg/g dw | -                                | -                  | 0.1                      | 0.7                  | 0.1         | 0.1         | <0.1          | 0.2         | 0.4         | 0.2         | <0.1        | 0.1         | 0.4         | <0.1     | 0.2      |
| Silver                  | µg/g dw | -                                | -                  | 0.1                      | 0.3                  | <0.1        | <0.1        | 0.2           | <0.1        | 0.1         | <0.1        | <0.1        | <0.1        | <0.1        | 0.8      | 0.2      |
| Strontium               | µg/g dw | -                                | -                  | 0.5                      | 130                  | 60          | 58          | 50            | 74          | 78          | 58          | 52          | 54          | 230         | 38       | 140      |
| Thallium                | µg/g dw | -                                | -                  | 0.2                      | 0.4                  | <0.2        | <0.2        | <0.2          | <0.2        | <0.2        | <0.2        | <0.2        | <0.2        | 0.2         | <0.2     | <0.2     |
| Tin                     | µg/g dw | -                                | -                  | 0.1                      | 0.2                  | 0.3         | 0.2         | 0.2           | 0.2         | <0.1        | 0.2         | 0.2         | 0.1         | 0.3         | 0.2      | 0.2      |
| Titanium                | µg/g dw | -                                | -                  | 0.5                      | 560                  | 320         | 230         | 280           | 380         | 320         | 370         | 220         | 280         | 910         | 240      | 660      |
| Uranium                 | µg/g dw | -                                | -                  | 0.1                      | 5.7                  | 1.1         | 1.2         | 1.2           | 4.9         | 3.4         | 1.7         | 0.9         | 1.1         | 3.7         | 0.4      | 2.4      |
| Vanadium                | µg/g dw | -                                | -                  | 0.1                      | 40.0                 | 15.0        | 14.0        | 14.0          | 24.0        | 19.0        | 14.0        | 11.0        | 12.0        | 48.0        | 8.6      | 36.0     |
| Zinc                    | µg/g dw | 123                              | 315                | 0.5                      | 71                   | 24          | 27          | 30            | 64          | 44          | 30          | 23          | 30          | 86          | 15       | 69       |
| Radionuclides           |         |                                  |                    |                          |                      |             |             |               |             |             |             |             |             |             |          |          |
| Lead-210                | Bq/g dw | -                                | -                  | 0.02                     | 0.16                 | 0.08        | 0.09        | <0.02         | 0.14        | 0.24        | <0.02       | 0.07        | 0.04        | 0.10        | <0.02    | 0.02     |
| Polonium-210            | Bq/g dw | -                                | -                  | 0.01                     | 0.15                 | 0.08        | 0.08        | 0.02          | 0.16        | 0.21        | 0.04        | 0.07        | 0.09        | 0.13        | 0.01     | 0.06     |
| Radium-226              | Bq/g dw | -                                | -                  | 0.01                     | 0.08                 | 0.02        | 0.01        | 0.01          | 0.09        | 0.03        | 0.03        | 0.02        | 0.02        | 0.02        | <0.01    | 0.02     |
| Thorium-228             | Bq/g dw | -                                | -                  | 0.02                     | 0.07                 | 0.03        | 0.02        | 0.03          | 0.02        | 0.07        | 0.03        | 0.04        | 0.04        | 0.07        | <0.02    | 0.06     |
| Thorium-230             | Bq/g dw | -                                | -                  | 0.02                     | 0.07                 | 0.04        | 0.03        | 0.02          | 0.03        | 0.05        | 0.03        | <0.02       | 0.02        | 0.04        | 0.02     | 0.06     |
| Thorium-232             | Bq/g dw | -                                | -                  | 0.02                     | 0.07                 | 0.05        | 0.02        | 0.02          | 0.04        | 0.09        | <0.02       | 0.03        | 0.02        | 0.05        | <0.02    | 0.06     |

Table X.III-4  
Sediment Chemistry for Lakes in the Kiggavik Project Area, Fall 2008

| Parameter                    | Units   | CCME Sediment Quality Guidelines |                    | DL                       | Caribou Lake Sub-Basin |             |             |             |              |             | Judge Sissons Sub-Basin |             |             |             |             |
|------------------------------|---------|----------------------------------|--------------------|--------------------------|------------------------|-------------|-------------|-------------|--------------|-------------|-------------------------|-------------|-------------|-------------|-------------|
|                              |         |                                  |                    |                          | Ridge Lake             | Cirque Lake | Crash Lake  | Fox Lake    | Caribou Lake | Calf Lake   | Judge Sissons Lake      |             |             |             |             |
|                              |         | ISQG <sup>(a)</sup>              | PEL <sup>(b)</sup> |                          | RDL-001-F08            | CQL-001-F08 | CRL-001-F08 | FXL-001-F08 | CBL-001-F08  | CFL-001-F08 | JSL-001-F08             | JSL-002-F08 | JSL-006-F08 | JSL-007-F08 | JSL-008-F08 |
|                              |         |                                  |                    |                          | 6-Sep-08               | 7-Sep-08    | 6-Sep-08    | 7-Sep-08    | 6-Sep-08     | 5-Sep-08    | 28-Aug-08               | 26-Aug-08   | 28-Aug-08   | 29-Aug-08   | 30-Aug-08   |
| <b>Physical Properties</b>   |         |                                  |                    |                          |                        |             |             |             |              |             |                         |             |             |             |             |
| Gravel                       | %       | -                                | -                  | 1                        | 1.0                    | 2.0         | 4.0         | <1          | <1           | 1.0         | <1                      | 1.0         | 17.0        | 1.0         | 5.0         |
| Coarse Sand                  | %       | -                                | -                  | 1                        | 6.0                    | 16.0        | 20.0        | 1.0         | 2.0          | 6.0         | <1                      | 28.0        | 53.0        | 28.0        | 26.0        |
| Fine Sand                    | %       | -                                | -                  | 1                        | 5.0                    | 19.0        | 28.0        | 12.0        | 71.0         | 24.0        | 2.0                     | 12.0        | 21.0        | 52.0        | 22.0        |
| Silt                         | %       | -                                | -                  | 1                        | 64.0                   | 50.0        | 36.0        | 73.0        | 24.0         | 60.0        | 71.0                    | 37.0        | 8.0         | 18.0        | 40.0        |
| Clay                         | %       | -                                | -                  | 1                        | 25.0                   | 14.0        | 12.0        | 14.0        | 3.0          | 8.0         | 27.0                    | 21.0        | 1.0         | 1.0         | 7.0         |
| Moisture <sup>(d)</sup>      | %       | -                                | -                  | 0.5                      | 56.7                   | 70.4        | 53.9        | 57.3        | 47.7         | 51.8        | 81.4                    | 32.1        | 18.1        | 60.8        | 62.8        |
| Moisture <sup>(e)</sup>      | %       | -                                | -                  | 0.5                      | 74.8                   | 79.2        | 60.9        | 75.1        | 48.8         | 33.8        | 87.7                    | 78.2        | 40.7        | 68.2        | 61.4        |
| <b>Nutrients</b>             |         |                                  |                    |                          |                        |             |             |             |              |             |                         |             |             |             |             |
| Total Organic Carbon         | %       | -                                | -                  | 0.1                      | 2.9                    | 5.5         | 6.3         | 5.4         | 1.3          | 3.1         | 7.6                     | 1.3         | 0.5         | 2.9         | 3.7         |
| <b>Major Ions</b>            |         |                                  |                    |                          |                        |             |             |             |              |             |                         |             |             |             |             |
| Calcium                      | µg/g dw | -                                | -                  | 1                        | 2,820                  | 3,320       | 2,950       | 4,280       | 2,150        | 3,330       | 3,270                   | 3,220       | 1,920       | 2,880       | 3,760       |
| Magnesium                    | µg/g dw | -                                | -                  | 1                        | 7,060                  | 6,330       | 4,650       | 7,100       | 2,630        | 5,060       | 5,820                   | 5,630       | 2,490       | 3,940       | 4,760       |
| Potassium                    | µg/g dw | -                                | -                  | 1                        | 8,650                  | 8,500       | 4,340       | 7,970       | 2,010        | 7,350       | 4,240                   | 5,360       | 3,040       | 5,010       | 3,060       |
| Sodium                       | µg/g dw | -                                | -                  | 1                        | 110                    | 120         | 65          | 110         | 41           | 120         | 77                      | 110         | 25          | 150         | 150         |
| Sulphate                     | µg/g dw | -                                | -                  | 10                       | 1,600                  | 2,700       | 1,600       | 2,000       | 370          | 1,100       | 4,300                   | 2,200       | 360         | 1,200       | 1,500       |
| <b>Metals and Metalloids</b> |         |                                  |                    |                          |                        |             |             |             |              |             |                         |             |             |             |             |
| Aluminum                     | µg/g dw | -                                | -                  | 0.5 or 20 (c)            | 30,300                 | 30,300      | 19,500      | 29,300      | 7,500        | 24,200      | 20,500                  | 22,300      | 11,000      | 15,800      | 13,600      |
| Antimony                     | µg/g dw | -                                | -                  | 0.2                      | <0.2                   | <0.2        | <0.2        | <0.2        | <0.2         | <0.2        | <0.2                    | <0.2        | <0.2        | <0.2        | <0.2        |
| Arsenic                      | µg/g dw | 5.9                              | 17.0               | 0.1                      | <b>45</b>              | <b>16</b>   | <b>10</b>   | <b>10</b>   | 3.1          | <b>8.1</b>  | <b>15</b>               | <b>11</b>   | 4.5         | <b>7.6</b>  | 5.4         |
| Barium                       | µg/g dw | -                                | -                  | 0.5                      | 540                    | 350         | 310         | 300         | 58           | 190         | 220                     | 180         | 100         | 160         | 130         |
| Beryllium                    | µg/g dw | -                                | -                  | 0.1                      | 2                      | 2.2         | 1.2         | 1.5         | 0.4          | 1.2         | 1.6                     | 1.3         | 0.5         | 0.9         | 0.7         |
| Boron                        | µg/g dw | -                                | -                  | 1                        | 47                     | 34          | 8           | 38          | 9            | 50          | <1                      | <1          | 2           | 10          | <1          |
| Cadmium                      | µg/g dw | 0.6                              | 3.5                | 0.1                      | 0.2                    | <b>0.6</b>  | 0.2         | 0.2         | <0.1         | 0.1         | 0.5                     | 0.3         | <0.1        | <0.1        | 0.2         |
| Chromium                     | µg/g dw | 37.3                             | 90.0               | 0.5                      | <b>76</b>              | <b>50</b>   | <b>71</b>   | <b>43</b>   | 30           | 29          | <b>53</b>               | 21          | 34          | <b>39</b>   | <b>44</b>   |
| Cobalt                       | µg/g dw | -                                | -                  | 0.2                      | 8.4                    | 13          | 7.4         | 7.3         | 3.3          | 5.5         | 8.9                     | 30          | 2.9         | 4.7         | 5.2         |
| Copper                       | µg/g dw | 35.7                             | 197.0              | 0.5                      | 31                     | <b>59</b>   | 17          | 24          | 6.4          | 11          | <b>43</b>               | 25          | 3.2         | 7.7         | 11          |
| Iron                         | µg/g dw | -                                | -                  | 0.5 or 20 <sup>(c)</sup> | 68,600                 | 30,300      | 17,400      | 15,900      | 7,310        | 15,800      | 37,200                  | 34,700      | 12,300      | 17,200      | 16,000      |
| Lead                         | µg/g dw | 35.0                             | 91.3               | 0.1                      | 15.0                   | 18.0        | 9.2         | 20.0        | 4.9          | 9.6         | 16.0                    | 12.0        | 4.9         | 7.1         | 8.8         |
| Manganese                    | µg/g dw | -                                | -                  | 0.5                      | 510                    | 360         | 200         | 180         | 86           | 180         | 340                     | 370         | 130         | 290         | 180         |
| Molybdenum                   | µg/g dw | -                                | -                  | 0.1                      | 11.0                   | 17.0        | 1.8         | 1.2         | 0.4          | 0.7         | 2.8                     | 2.6         | 0.4         | 0.7         | 0.6         |
| Nickel                       | µg/g dw | -                                | -                  | 0.1                      | 35.0                   | 43.0        | 29.0        | 33.0        | 10.0         | 20.0        | 41.0                    | 42.0        | 9.6         | 17.0        | 21.0        |
| Selenium                     | µg/g dw | -                                | -                  | 0.1                      | 0.6                    | 0.9         | 0.3         | 0.4         | 0.1          | 0.2         | 0.9                     | 0.7         | 0.1         | 0.2         | 0.2         |
| Silver                       | µg/g dw | -                                | -                  | 0.1                      | 0.2                    | 0.2         | <0.1        | 0.1         | <0.1         | <0.1        | 0.2                     | 0.1         | <0.1        | <0.1        | <0.1        |
| Strontium                    | µg/g dw | -                                | -                  | 0.5                      | 150                    | 170         | 86          | 180         | 67           | 170         | 130                     | 180         | 86          | 100         | 110         |
| Thallium                     | µg/g dw | -                                | -                  | 0.2                      | 0.3                    | 0.4         | <0.2        | 0.2         | <0.2         | 0.2         | <0.2                    | 0.2         | <0.2        | <0.2        | <0.2        |
| Tin                          | µg/g dw | -                                | -                  | 0.1                      | 0.2                    | 0.2         | 0.1         | 0.2         | 0.2          | 0.3         | 0.1                     | 0.1         | 0.2         | 0.2         | 0.2         |
| Titanium                     | µg/g dw | -                                | -                  | 0.5                      | 400                    | 500         | 280         | 580         | 320          | 620         | 410                     | 460         | 310         | 450         | 550         |
| Uranium                      | µg/g dw | -                                | -                  | 0.1                      | 3.2                    | 15.0        | 2.7         | 3.2         | 0.8          | 2.1         | 4.4                     | 3.8         | 0.9         | 1.4         | 1.8         |
| Vanadium                     | µg/g dw | -                                | -                  | 0.1                      | 42.0                   | 42.0        | 29.0        | 38.0        | 15.0         | 32.0        | 41.0                    | 34.0        | 16.0        | 25.0        | 27.0        |
| Zinc                         | µg/g dw | 123                              | 315                | 0.5                      | 68                     | <b>130</b>  | 71          | 80          | 29           | 49          | 110                     | 93          | 23          | 39          | 69          |
| <b>Radionuclides</b>         |         |                                  |                    |                          |                        |             |             |             |              |             |                         |             |             |             |             |
| Lead-210                     | Bq/g dw | -                                | -                  | 0.02                     | 0.11                   | 0.18        | 0.04        | 0.05        | <0.02        | 0.03        | 0.22                    | 0.09        | 0.03        | <0.02       | 0.09        |
| Polonium-210                 | Bq/g dw | -                                | -                  | 0.01                     | 0.11                   | 0.13        | 0.05        | 0.07        | 0.01         | 0.05        | 0.18                    | 0.08        | 0.05        | 0.12        | 0.12        |
| Radium-226                   | Bq/g dw | -                                | -                  | 0.01                     | 0.08                   | 0.04        | 0.05        | 0.04        | 0.02         | 0.04        | 0.04                    | 0.03        | 0.04        | 0.03        | 0.03        |
| Thorium-228                  | Bq/g dw | -                                | -                  | 0.02                     | 0.04                   | 0.08        | 0.05        | 0.07        | 0.04         | 0.03        | 0.08                    | 0.07        | 0.05        | 0.06        | 0.05        |
| Thorium-230                  | Bq/g dw | -                                | -                  | 0.02                     | 0.04                   | 0.09        | 0.06        | 0.06        | 0.03         | 0.04        | 0.05                    | 0.04        | 0.04        | <0.02       | 0.04        |
| Thorium-232                  | Bq/g dw | -                                | -                  | 0.02                     | 0.06                   | 0.06        | 0.06        | 0.05        | 0.04         | 0.05        | 0.06                    | 0.06        | 0.04        | 0.03        | 0.05        |

Table X.III-4  
Sediment Chemistry for Lakes in the Kiggavik Project Area, Fall 2008

| Parameter               | Units   | CCME Sediment Quality Guidelines |                    | DL                       | Siamese Lake Sub-Basin |             | Skinny Lake Sub-Basin |             |             | Squiggly Lake Sub-Basin |             |             |
|-------------------------|---------|----------------------------------|--------------------|--------------------------|------------------------|-------------|-----------------------|-------------|-------------|-------------------------|-------------|-------------|
|                         |         |                                  |                    |                          | Siamese Lake           |             | Skinny Lake           |             |             | Squiggly Lake           |             |             |
|                         |         | ISQG <sup>(a)</sup>              | PEL <sup>(b)</sup> |                          | SML-001-F08            | SML-002-F08 | SKL-001-F08           | SKL-002-F08 | SKL-003-F08 | SQL-001-F08             | SQL-002-F08 | SQL-003-F08 |
|                         |         |                                  |                    |                          | 31-Aug-08              | 30-Aug-08   | 1-Sep-08              | 1-Sep-08    | 1-Sep-08    | 1-Sep-08                | 1-Sep-08    | 1-Sep-08    |
| Physical Properties     |         |                                  |                    |                          |                        |             |                       |             |             |                         |             |             |
| Gravel                  | %       | -                                | -                  | 1                        | <1                     | <1          | -                     | -           | -           | -                       | -           | -           |
| Coarse Sand             | %       | -                                | -                  | 1                        | <1                     | <1          | -                     | -           | -           | -                       | -           | -           |
| Fine Sand               | %       | -                                | -                  | 1                        | 35.0                   | 7.0         | -                     | -           | -           | -                       | -           | -           |
| Silt                    | %       | -                                | -                  | 1                        | 60.0                   | 83.0        | -                     | -           | -           | -                       | -           | -           |
| Clay                    | %       | -                                | -                  | 1                        | 6.0                    | 11.0        | -                     | -           | -           | -                       | -           | -           |
| Moisture <sup>(d)</sup> | %       | -                                | -                  | 0.5                      | 74.5                   | 72.0        | -                     | -           | -           | -                       | -           | -           |
| Moisture <sup>(e)</sup> | %       | -                                | -                  | 0.5                      | 82.1                   | 77.3        | 60.6                  | 77.4        | 53.9        | 75.9                    | 76.5        | 68.2        |
| Nutrients               |         |                                  |                    |                          |                        |             |                       |             |             |                         |             |             |
| Total Organic Carbon    | %       | -                                | -                  | 0.1                      | 5.6                    | 8.5         | -                     | -           | -           | -                       | -           | -           |
| Major Ions              |         |                                  |                    |                          |                        |             |                       |             |             |                         |             |             |
| Calcium                 | µg/g dw | -                                | -                  | 1                        | 2,620                  | 2,750       | 1,920                 | 2,710       | 3,030       | 2,230                   | 2,340       | 2,770       |
| Magnesium               | µg/g dw | -                                | -                  | 1                        | 3,230                  | 3,280       | 3,110                 | 4,580       | 3,200       | 4,220                   | 4,640       | 7,030       |
| Potassium               | µg/g dw | -                                | -                  | 1                        | 3,070                  | 3,460       | 4,980                 | 7,570       | 4,630       | 4,670                   | 8,560       | 17,800      |
| Sodium                  | µg/g dw | -                                | -                  | 1                        | 89                     | 120         | 100                   | 160         | 140         | 44                      | 160         | 180         |
| Sulphate                | µg/g dw | -                                | -                  | 10                       | 3,600                  | 4,600       | 1,100                 | 2,400       | 700         | 4,000                   | 2,100       | 4,300       |
| Metals and Metalloids   |         |                                  |                    |                          |                        |             |                       |             |             |                         |             |             |
| Aluminum                | µg/g dw | -                                | -                  | 0.5 or 20 (c)            | 12,900                 | 14,200      | 18,600                | 26,100      | 15,200      | 22,100                  | 30,900      | 57,100      |
| Antimony                | µg/g dw | -                                | -                  | 0.2                      | <0.2                   | <0.2        | <0.2                  | <0.2        | <0.2        | <0.2                    | <0.2        | <0.2        |
| Arsenic                 | µg/g dw | 5.9                              | 17.0               | 0.1                      | 6.2                    | 7.1         | 12                    | 10          | 4.3         | 8.9                     | 8.7         | 14          |
| Barium                  | µg/g dw | -                                | -                  | 0.5                      | 190                    | 190         | 220                   | 260         | 160         | 240                     | 210         | 340         |
| Beryllium               | µg/g dw | -                                | -                  | 0.1                      | 0.9                    | 0.9         | 2.1                   | 2.7         | 1           | 1.4                     | 1.4         | 2.6         |
| Boron                   | µg/g dw | -                                | -                  | 1                        | <1                     | <1          | 2                     | 4           | <1          | <1                      | 52          | 160         |
| Cadmium                 | µg/g dw | 0.6                              | 3.5                | 0.1                      | 0.3                    | 0.2         | 0.4                   | 0.4         | <0.1        | 0.3                     | 0.6         | 0.4         |
| Chromium                | µg/g dw | 37.3                             | 90.0               | 0.5                      | 41                     | 23          | 34                    | 24          | 13          | 25                      | 25          | 15          |
| Cobalt                  | µg/g dw | -                                | -                  | 0.2                      | 4.8                    | 4.3         | 14                    | 6.8         | 2.8         | 5.9                     | 6.7         | 9.9         |
| Copper                  | µg/g dw | 35.7                             | 197.0              | 0.5                      | 27                     | 27          | 25                    | 31          | 9.5         | 32                      | 28          | 50          |
| Iron                    | µg/g dw | -                                | -                  | 0.5 or 20 <sup>(c)</sup> | 20,100                 | 18,200      | 61,500                | 41,200      | 10,800      | 20,200                  | 17,600      | 36,200      |
| Lead                    | µg/g dw | 35.0                             | 91.3               | 0.1                      | 11.0                   | 13.0        | 11.0                  | 16.0        | 7.5         | 15.0                    | 12.0        | 19.0        |
| Manganese               | µg/g dw | -                                | -                  | 0.5                      | 180                    | 150         | 380                   | 190         | 110         | 230                     | 210         | 340         |
| Molybdenum              | µg/g dw | -                                | -                  | 0.1                      | 1.2                    | 1.2         | 2.1                   | 1.9         | 0.3         | 2.4                     | 1.6         | 3.0         |
| Nickel                  | µg/g dw | -                                | -                  | 0.1                      | 19.0                   | 19.0        | 22.0                  | 24.0        | 11.0        | 26.0                    | 26.0        | 39.0        |
| Selenium                | µg/g dw | -                                | -                  | 0.1                      | 0.7                    | 0.6         | 0.7                   | 0.7         | 0.2         | 0.7                     | 0.7         | 1.0         |
| Silver                  | µg/g dw | -                                | -                  | 0.1                      | 0.1                    | 0.1         | 0.2                   | 0.2         | <0.1        | 0.2                     | 0.2         | 0.3         |
| Strontium               | µg/g dw | -                                | -                  | 0.5                      | 83                     | 110         | 85                    | 110         | 110         | 110                     | 120         | 210         |
| Thallium                | µg/g dw | -                                | -                  | 0.2                      | <0.2                   | <0.2        | 0.3                   | 0.2         | <0.2        | <0.2                    | 0.3         | 0.4         |
| Tin                     | µg/g dw | -                                | -                  | 0.1                      | 0.4                    | 0.1         | 0.2                   | 0.2         | 0.3         | <0.1                    | 0.2         | 0.3         |
| Titanium                | µg/g dw | -                                | -                  | 0.5                      | 290                    | 350         | 230                   | 390         | 430         | 190                     | 460         | 590         |
| Uranium                 | µg/g dw | -                                | -                  | 0.1                      | 2.5                    | 2.5         | 5.5                   | 6.8         | 2.5         | 4.3                     | 4.6         | 7.1         |
| Vanadium                | µg/g dw | -                                | -                  | 0.1                      | 22.0                   | 22.0        | 21.0                  | 28.0        | 18.0        | 26.0                    | 30.0        | 46.0        |
| Zinc                    | µg/g dw | 123                              | 315                | 0.5                      | 56                     | 48          | 82                    | 91          | 40          | 80                      | 110         | 120         |
| Radionuclides           |         |                                  |                    |                          |                        |             |                       |             |             |                         |             |             |
| Lead-210                | Bq/g dw | -                                | -                  | 0.02                     | 0.18                   | 0.16        | 0.08                  | 0.18        | 0.06        | 0.38                    | 0.12        | 0.17        |
| Polonium-210            | Bq/g dw | -                                | -                  | 0.01                     | 0.22                   | 0.19        | 0.10                  | 0.24        | 0.07        | 0.45                    | 0.19        | 0.23        |
| Radium-226              | Bq/g dw | -                                | -                  | 0.01                     | 0.04                   | 0.03        | 0.08                  | 0.09        | 0.03        | 0.03                    | 0.06        | 0.07        |
| Thorium-228             | Bq/g dw | -                                | -                  | 0.02                     | 0.07                   | 0.07        | 0.13                  | 0.10        | 0.06        | 0.11                    | 0.09        | 0.08        |
| Thorium-230             | Bq/g dw | -                                | -                  | 0.02                     | 0.05                   | 0.04        | 0.07                  | 0.09        | 0.06        | 0.08                    | 0.06        | 0.08        |
| Thorium-232             | Bq/g dw | -                                | -                  | 0.02                     | 0.04                   | 0.06        | 0.10                  | 0.09        | 0.06        | 0.06                    | 0.07        | 0.08        |

Notes: Values greater than or equal to ISQGs are bolded.

Values greater than or equal to PELs are bolded and underlined.

Non-detect values that have detection limits that are greater than guidelines are italicized.

<sup>(a)</sup> = ISQG = Interim Freshwater Sediment Quality Guidelines (CCME 2002).

<sup>(b)</sup> = PEL = Probable Effect Levels (CCME 2002).

<sup>(c)</sup> = Detection limit for aluminum and iron was either 0.5 or 20 µg/g dw, depending on the sample

<sup>(d)</sup> = Moisture content measured on sample analyzed for particle size

<sup>(e)</sup> = Moisture content measured on sample for chemistry.

CCME = Canadian Council of Ministers of the Environment; DL = detection limit; % = percentage; µg/g dw = micrograms per gram dry weight; Bq/g dw = Becquerels per gram in dry weight; - = no data collected; Aug = August; Sep = September.

< = less than.

Table X.III-5  
Sediment Chemistry for Lakes in the Kiggavik Project Area, Fall 2009

| Parameter                    | Units   | CCME Sediment<br>Quality Guidelines |                    | DL                       | Willow Lake Sub-Basin |                |                |                |                |                |                |                |                |                |
|------------------------------|---------|-------------------------------------|--------------------|--------------------------|-----------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                              |         |                                     |                    |                          | Sik Sik Lake          |                |                |                |                | Rock Lake      |                |                |                |                |
|                              |         | ISQG <sup>(a)</sup>                 | PEL <sup>(b)</sup> |                          | SSL-SD001A-F09        | SSL-SD001B-F09 | SSL-SD001C-F09 | SSL-SD001D-F09 | SSL-SD001E-F09 | ROL-SD001A-F09 | ROL-SD001B-F09 | ROL-SD001C-F09 | ROL-SD001D-F09 | ROL-SD001E-F09 |
|                              |         |                                     |                    |                          | 18-Aug-09             | 18-Aug-09      | 18-Aug-09      | 18-Aug-09      | 18-Aug-09      | 19-Aug-09      | 19-Aug-09      | 19-Aug-09      | 19-Aug-09      | 19-Aug-09      |
| <b>Physical Properties</b>   |         |                                     |                    |                          |                       |                |                |                |                |                |                |                |                |                |
| Gravel                       | %       | -                                   | -                  | 1.0                      | <1.0                  | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           |
| Coarse Sand                  | %       | -                                   | -                  | 1.0                      | <1.0                  | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           |
| Fine Sand                    | %       | -                                   | -                  | 1.0                      | 1.0                   | 1.0            | 1.0            | 1.0            | 1.0            | 1.0            | <1.0           | <1.0           | 1.0            | 1.0            |
| Silt                         | %       | -                                   | -                  | 1.0                      | 62.0                  | 62.0           | 51.0           | 63.0           | 68.0           | 81.0           | 82.0           | 80.0           | 83.0           | 86.0           |
| Clay                         | %       | -                                   | -                  | 1.0                      | 37.0                  | 36.0           | 48.0           | 36.0           | 31.0           | 18.0           | 18.0           | 19.0           | 16.0           | 13.0           |
| Moisture <sup>(c)</sup>      | %       | -                                   | -                  | 0.1                      | 68.4                  | 59.2           | 63.2           | 82.7           | 76.2           | 67.4           | 70.1           | 76.3           | 70.6           | 75.6           |
| Moisture <sup>(d)</sup>      | %       | -                                   | -                  | 0.01                     | 65.08                 | 58.91          | 61.34          | 72.02          | 73.77          | 60.67          | 64.43          | 42.90          | 68.38          | 62.98          |
| Loss on Ignition             | %       | -                                   | -                  | 0.1                      | 15.5                  | 14.3           | 14.6           | 18.2           | 15.0           | 13.9           | 13.8           | 14.6           | 14.5           | 13.6           |
| <b>Nutrients</b>             |         |                                     |                    |                          |                       |                |                |                |                |                |                |                |                |                |
| Nitrogen                     | %       | -                                   | -                  | 0.02                     | 0.646                 | 0.584          | 0.575          | 0.680          | 0.816          | 0.504          | 0.538          | 0.553          | 0.554          | 0.549          |
| Phosphorus                   | µg/g dw | -                                   | -                  | 1                        | 980                   | 980            | 960            | 1,000          | 1,150          | 1,200          | 1,230          | 1,050          | 1,240          | 1,280          |
| Total Organic Carbon         | %       | -                                   | -                  | 0.1                      | 6.76                  | 6.50           | 6.24           | 7.01           | 6.80           | 6.45           | 6.42           | 6.65           | 6.59           | 6.20           |
| <b>Major Ions</b>            |         |                                     |                    |                          |                       |                |                |                |                |                |                |                |                |                |
| Calcium                      | µg/g dw | -                                   | -                  | 1                        | 5,870                 | 5,120          | 6,200          | 5,540          | 5,270          | 5,160          | 5,220          | 4,330          | 5,200          | 5,270          |
| Magnesium                    | µg/g dw | -                                   | -                  | 1                        | 9,350                 | 8,350          | 8,310          | 7,750          | 8,190          | 7,380          | 7,530          | 6,400          | 7,270          | 7,450          |
| Potassium                    | µg/g dw | -                                   | -                  | 1                        | 8,420                 | 6,840          | 6,890          | 7,440          | 7,800          | 9,020          | 8,040          | 4,750          | 8,720          | 8,740          |
| Sodium                       | µg/g dw | -                                   | -                  | 1                        | 120                   | 83             | 81             | 82             | 96             | 150            | 130            | 87             | 160            | 150            |
| Sulfate, acid soluble        | µg/g dw | -                                   | -                  | 10                       | 2,200                 | 1,900          | 1,900          | 1,900          | 2,300          | 1,600          | 1,900          | 1,600          | 1,800          | 1,600          |
| <b>Metals and Metalloids</b> |         |                                     |                    |                          |                       |                |                |                |                |                |                |                |                |                |
| Aluminum                     | µg/g dw | -                                   | -                  | 20 or 300 <sup>(e)</sup> | 30,800                | 26,600         | 26,900         | 26,900         | 28,500         | 32,600         | 29,100         | 20,300         | 30,400         | 31,000         |
| Antimony                     | µg/g dw | -                                   | -                  | 0.2                      | <0.2                  | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           |
| Arsenic                      | µg/g dw | 5.9                                 | 17                 | 0.1                      | <b>11</b>             | <b>9.3</b>     | <b>11</b>      | <b>9.2</b>     | <b>10</b>      | <b>11</b>      | <b>11</b>      | <b>11</b>      | <b>11</b>      | <b>11</b>      |
| Barium                       | µg/g dw | -                                   | -                  | 0.5                      | 350                   | 340            | 330            | 300            | 330            | 380            | 360            | 300            | 350            | 350            |
| Beryllium                    | µg/g dw | -                                   | -                  | 0.1                      | 1.3                   | 1.3            | 1.2            | 1.2            | 1.3            | 1.2            | 1.2            | 1.0            | 1.1            | 1.1            |
| Boron                        | µg/g dw | -                                   | -                  | 1                        | <1                    | <1             | <1             | <1             | <1             | <1             | <1             | <1             | <1             | <1             |
| Cadmium                      | µg/g dw | 0.6                                 | 3.5                | 0.1                      | 0.2                   | 0.2            | 0.2            | 0.2            | 0.2            | 0.2            | 0.2            | 0.2            | 0.2            | 0.2            |
| Chromium                     | µg/g dw | 37.3                                | 90.0               | 0.5                      | 30                    | 37             | 34             | <b>48</b>      | 32             | 33             | 37             | <b>50</b>      | 31             | 29             |
| Cobalt                       | µg/g dw | -                                   | -                  | 0.2                      | 8.8                   | 7.7            | 8.2            | 7.1            | 7.5            | 6.9            | 6.8            | 6.0            | 6.5            | 6.5            |
| Copper                       | µg/g dw | 35.7                                | 197                | 0.5                      | 27                    | 24             | 23             | 21             | 23             | 15             | 16             | 14             | 15             | 15             |
| Iron                         | µg/g dw | -                                   | -                  | 20 or 300 <sup>(e)</sup> | 33,600                | 33,000         | 37,100         | 29,900         | 28,600         | 28,900         | 29,600         | 26,500         | 28,800         | 29,400         |
| Lead                         | µg/g dw | 35.0                                | 91.3               | 0.1                      | 15                    | 14             | 14             | 13             | 14             | 17             | 17             | 15             | 16             | 17             |
| Manganese                    | µg/g dw | -                                   | -                  | 0.5                      | 440                   | 360            | 560            | 380            | 280            | 260            | 250            | 220            | 260            | 240            |
| Mercury                      | µg/g dw | -                                   | -                  | 0.05                     | <0.05                 | <0.05          | <0.05          | <0.05          | <0.05          | <0.05          | <0.05          | <0.05          | <0.05          | <0.05          |
| Molybdenum                   | µg/g dw | -                                   | -                  | 0.1                      | 0.7                   | 0.5            | 0.9            | 0.7            | 0.7            | 1.0            | 0.9            | 1.0            | 0.9            | 0.9            |
| Nickel                       | µg/g dw | -                                   | -                  | 0.1                      | 38                    | 34             | 34             | 32             | 34             | 27             | 28             | 25             | 26             | 27             |
| Selenium                     | µg/g dw | -                                   | -                  | 0.1                      | 0.5                   | 0.4            | 0.4            | 0.4            | 0.4            | 0.3            | 0.4            | 0.3            | 0.3            | 0.4            |
| Silver                       | µg/g dw | -                                   | -                  | 0.1                      | 0.1                   | <0.1           | <0.1           | <0.1           | <0.1           | <0.1           | <0.1           | 0.2            | <0.1           | <0.1           |
| Strontium                    | µg/g dw | -                                   | -                  | 0.5                      | 260                   | 230            | 230            | 210            | 240            | 300            | 290            | 200            | 300            | 290            |
| Thallium                     | µg/g dw | -                                   | -                  | 0.2                      | 0.2                   | <0.2           | <0.2           | <0.2           | <0.2           | 0.2            | 0.2            | <0.2           | 0.2            | 0.2            |
| Tin                          | µg/g dw | -                                   | -                  | 0.1                      | 0.2                   | 0.1            | 0.2            | 0.3            | 0.2            | 0.4            | 0.5            | 0.3            | 0.4            | 0.3            |
| Titanium                     | µg/g dw | -                                   | -                  | 0.5                      | 580                   | 500            | 520            | 510            | 550            | 880            | 850            | 610            | 850            | 880            |
| Uranium                      | µg/g dw | -                                   | -                  | 0.1                      | 4.5                   | 3.8            | 4.1            | 3.4            | 3.8            | 3.5            | 3.6            | 3.1            | 3.4            | 3.9            |
| Vanadium                     | µg/g dw | -                                   | -                  | 0.1                      | 48                    | 43             | 44             | 42             | 44             | 52             | 51             | 42             | 50             | 50             |
| Zinc                         | µg/g dw | 123                                 | 315                | 0.5                      | 68                    | 63             | 63             | 60             | 63             | 77             | 79             | 68             | 74             | 76             |
| <b>Radionuclides</b>         |         |                                     |                    |                          |                       |                |                |                |                |                |                |                |                |                |
| Lead-210                     | Bq/g dw | -                                   | -                  | 0.04                     | <0.04                 | 0.05           | 0.10           | 0.10           | 0.15           | <0.04          | 0.05           | 0.06           | <0.04          | 0.10           |
| Polonium-210                 | Bq/g dw | -                                   | -                  | 0.01                     | 0.09                  | 0.09           | 0.08           | 0.13           | 0.15           | 0.12           | 0.12           | 0.12           | 0.12           | 0.11           |
| Radium-226                   | Bq/g dw | -                                   | -                  | 0.01                     | 0.05                  | 0.07           | 0.06           | 0.05           | 0.06           | 0.06           | 0.06           | 0.05           | 0.05           | 0.08           |
| Thorium-228                  | Bq/g dw | -                                   | -                  | 0.02                     | 0.10                  | 0.11           | 0.08           | 0.08           | 0.11           | 0.09           | 0.10           | 0.09           | 0.06           | 0.09           |
| Thorium-230                  | Bq/g dw | -                                   | -                  | 0.02                     | 0.06                  | 0.16           | 0.06           | 0.05           | 0.05           | 0.06           | 0.07           | 0.06           | 0.07           | 0.10           |
| Thorium-232                  | Bq/g dw | -                                   | -                  | 0.02                     | 0.10                  | 0.08           | 0.08           | 0.07           | 0.06           | 0.08           | 0.08           | 0.09           | 0.06           | 0.08           |

Table X.III-5  
Sediment Chemistry for Lakes in the Kiggavik Project Area, Fall 2009

| Parameter               | Units   | CCME Sediment<br>Quality Guidelines |                    | DL                       | Willow Lake Sub-Basin |                |                |                |                | Lower Lake Sub-Basin |                |                |                |                | Judge Sissons Lake Sub-Basin |                |
|-------------------------|---------|-------------------------------------|--------------------|--------------------------|-----------------------|----------------|----------------|----------------|----------------|----------------------|----------------|----------------|----------------|----------------|------------------------------|----------------|
|                         |         |                                     |                    |                          | Willow Lake           |                |                |                |                | Andrew Lake          |                |                |                |                | Judge Sissons Lake           |                |
|                         |         |                                     |                    |                          | WIL-SD001A-F09        | WIL-SD001B-F09 | WIL-SD001C-F09 | WIL-SD001D-F09 | WIL-SD001E-F09 | ANL-SD001A-F09       | ANL-SD001B-F09 | ANL-SD001C-F09 | ANL-SD001D-F09 | ANL-SD001E-F09 | JSL-SD001A-F09               | JSL-SD001B-F09 |
|                         |         | ISQG <sup>(a)</sup>                 | PEL <sup>(b)</sup> |                          | 20-Aug-09             | 20-Aug-09      | 20-Aug-09      | 20-Aug-09      | 20-Aug-09      | 21-Aug-09            | 21-Aug-09      | 21-Aug-09      | 21-Aug-09      | 21-Aug-09      | 19-Aug-09                    | 19-Aug-09      |
| Physical Properties     |         |                                     |                    |                          |                       |                |                |                |                |                      |                |                |                |                |                              |                |
| Gravel                  | %       | -                                   | -                  | 1.0                      | <1.0                  | <1.0           | <1.0           | <1.0           | <1.0           | <1.0                 | 1              | <1.0           | <1.0           | 4              | <1.0                         | <1.0           |
| Coarse Sand             | %       | -                                   | -                  | 1.0                      | <1.0                  | <1.0           | 1.0            | <1.0           | <1.0           | 55.0                 | 52.0           | 61.0           | 63.0           | 38.0           | 1.0                          | <1.0           |
| Fine Sand               | %       | -                                   | -                  | 1.0                      | 3.0                   | 3.0            | 38.0           | 4.0            | 3.0            | 37.0                 | 42.0           | 32.0           | 29.0           | 39.0           | 2.0                          | 2.0            |
| Silt                    | %       | -                                   | -                  | 1.0                      | 86.0                  | 86.0           | 53.0           | 87.0           | 83.0           | 7.0                  | 5.0            | 6.0            | 7.0            | 18.0           | 72.0                         | 74.0           |
| Clay                    | %       | -                                   | -                  | 1.0                      | 11.0                  | 11.0           | 7.0            | 8.0            | 14.0           | 1.0                  | <1.0           | <1.0           | <1.0           | 1.0            | 26.0                         | 24.0           |
| Moisture <sup>(c)</sup> | %       | -                                   | -                  | 0.1                      | 62.3                  | 66.0           | 40.5           | 62.1           | 79.0           | 37.3                 | 24.6           | 28.4           | 32.9           | 31.4           | 83.8                         | 85.3           |
| Moisture <sup>(d)</sup> | %       | -                                   | -                  | 0.01                     | 64.26                 | 66.19          | 52.28          | 71.27          | 70.17          | 48.71                | 29.36          | 40.36          | 27.60          | 37.71          | 84.06                        | 84.63          |
| Loss on Ignition        | %       | -                                   | -                  | 0.1                      | 7.5                   | 7.1            | 4.3            | 6.5            | 11.7           | 1.5                  | 0.9            | 1.4            | 2.3            | 1.3            | 15.5                         | 15.3           |
| Nutrients               |         |                                     |                    |                          |                       |                |                |                |                |                      |                |                |                |                |                              |                |
| Nitrogen                | %       | -                                   | -                  | 0.02                     | 0.351                 | 0.311          | 0.174          | 0.295          | 0.393          | 0.063                | 0.045          | 0.053          | 0.067          | 0.076          | 0.715                        | 0.745          |
| Phosphorus              | µg/g dw | -                                   | -                  | 1                        | 1,110                 | 1,050          | 810            | 1,070          | 1,100          | 280                  | 280            | 270            | 280            | 290            | 1,300                        | 1,440          |
| Total Organic Carbon    | %       | -                                   | -                  | 0.1                      | 3.13                  | 3.10           | 1.53           | 2.60           | 5.49           | 0.50                 | 0.33           | 0.35           | 1.06           | 0.40           | 6.73                         | 7.31           |
| Major Ions              |         |                                     |                    |                          |                       |                |                |                |                |                      |                |                |                |                |                              |                |
| Calcium                 | µg/g dw | -                                   | -                  | 1                        | 4,700                 | 4,420          | 3,420          | 4,560          | 4,550          | 1,370                | 1,280          | 1,250          | 1,420          | 1,530          | 3,220                        | 3,240          |
| Magnesium               | µg/g dw | -                                   | -                  | 1                        | 5,930                 | 6,290          | 4,900          | 5,520          | 6,210          | 1,570                | 1,720          | 1,650          | 1,900          | 1,890          | 5,430                        | 5,880          |
| Potassium               | µg/g dw | -                                   | -                  | 1                        | 4,830                 | 6,390          | 3,600          | 4,880          | 5,360          | 1,500                | 1,170          | 1,340          | 1,880          | 1,950          | 6,240                        | 5,760          |
| Sodium                  | µg/g dw | -                                   | -                  | 1                        | 53                    | 87             | <1             | 47             | 54             | 8                    | <1             | <1             | 2              | <1             | 96                           | 73             |
| Sulfate, acid soluble   | µg/g dw | -                                   | -                  | 10                       | 1,100                 | 940            | 520            | 560            | 1,300          | <10                  | <10            | 140            | 160            | 170            | 3,100                        | 3,800          |
| Metals and Metalloids   |         |                                     |                    |                          |                       |                |                |                |                |                      |                |                |                |                |                              |                |
| Aluminum                | µg/g dw | -                                   | -                  | 20 or 300 <sup>(e)</sup> | 18,300                | 22,300         | 11,700         | 17,500         | 20,200         | 4,600                | 3,900          | 4,500          | 6,000          | 6,100          | 22,300                       | 22,600         |
| Antimony                | µg/g dw | -                                   | -                  | 0.2                      | <0.2                  | <0.2           | <0.2           | <0.2           | <0.2           | <0.2                 | <0.2           | <0.2           | <0.2           | <0.2           | <0.2                         | <0.2           |
| Arsenic                 | µg/g dw | 5.9                                 | 17                 | 0.1                      | 7.2                   | 7.9            | 5.2            | 7.5            | 8.0            | 1.3                  | 1.2            | 1.3            | 1.3            | 1.8            | 9.4                          | 13             |
| Barium                  | µg/g dw | -                                   | -                  | 0.5                      | 230                   | 240            | 170            | 210            | 250            | 75                   | 57             | 61             | 79             | 73             | 250                          | 240            |
| Beryllium               | µg/g dw | -                                   | -                  | 0.1                      | 0.8                   | 0.9            | 0.6            | 0.8            | 0.8            | 0.3                  | 0.2            | 0.2            | 0.3            | 0.3            | 1.1                          | 1.2            |
| Boron                   | µg/g dw | -                                   | -                  | 1                        | <1                    | <1             | <1             | <1             | <1             | <1                   | <1             | <1             | <1             | <1             | <1                           | <1             |
| Cadmium                 | µg/g dw | 0.6                                 | 3.5                | 0.1                      | 0.1                   | <0.1           | <0.1           | 0.1            | 0.2            | <0.1                 | <0.1           | <0.1           | <0.1           | <0.1           | 0.4                          | 0.5            |
| Chromium                | µg/g dw | 37.3                                | 90.0               | 0.5                      | 23                    | 30             | 18             | 22             | 19             | 7.7                  | 9.3            | 7.2            | 9.4            | 8.0            | 32                           | 43             |
| Cobalt                  | µg/g dw | -                                   | -                  | 0.2                      | 5.0                   | 5.5            | 4.1            | 5.1            | 5.5            | 1.2                  | 1.3            | 1.2            | 1.4            | 1.5            | 5.1                          | 7.5            |
| Copper                  | µg/g dw | 35.7                                | 197                | 0.5                      | 11                    | 13             | 8.8            | 11             | 14             | 2.7                  | 2.6            | 2.3            | 3.2            | 3.5            | 33                           | 38             |
| Iron                    | µg/g dw | -                                   | -                  | 20 or 300 <sup>(e)</sup> | 18,700                | 18,500         | 11,600         | 17,200         | 19,000         | 5,500                | 5,500          | 5,300          | 5,200          | 6,300          | 23,500                       | 31,200         |
| Lead                    | µg/g dw | 35.0                                | 91.3               | 0.1                      | 12                    | 12             | 8.5            | 11             | 13             | 2.5                  | 2.4            | 2.4            | 2.6            | 3.0            | 12                           | 15             |
| Manganese               | µg/g dw | -                                   | -                  | 0.5                      | 170                   | 160            | 120            | 160            | 180            | 44                   | 44             | 38             | 38             | 45             | 200                          | 250            |
| Mercury                 | µg/g dw | -                                   | -                  | 0.05                     | <0.05                 | <0.05          | <0.05          | <0.05          | <0.05          | <0.05                | <0.05          | <0.05          | <0.05          | <0.05          | <0.05                        | <0.05          |
| Molybdenum              | µg/g dw | -                                   | -                  | 0.1                      | 0.4                   | 0.5            | 0.5            | 0.5            | 0.6            | 0.2                  | 0.2            | 0.2            | 0.2            | 0.4            | 2.1                          | 3.0            |
| Nickel                  | µg/g dw | -                                   | -                  | 0.1                      | 21                    | 22             | 16             | 19             | 23             | 4.7                  | 4.9            | 4.7            | 5.9            | 5.8            | 28                           | 35             |
| Selenium                | µg/g dw | -                                   | -                  | 0.1                      | 0.2                   | 0.3            | 0.2            | 0.2            | 0.3            | <0.1                 | <0.1           | <0.1           | <0.1           | <0.1           | 0.7                          | 0.9            |
| Silver                  | µg/g dw | -                                   | -                  | 0.1                      | <0.1                  | <0.1           | <0.1           | <0.1           | <0.1           | <0.1                 | <0.1           | <0.1           | <0.1           | <0.1           | 0.2                          | 0.2            |
| Strontium               | µg/g dw | -                                   | -                  | 0.5                      | 220                   | 230            | 160            | 210            | 230            | 42                   | 33             | 37             | 48             | 51             | 160                          | 160            |
| Thallium                | µg/g dw | -                                   | -                  | 0.2                      | <0.2                  | <0.2           | <0.2           | <0.2           | <0.2           | <0.2                 | <0.2           | <0.2           | <0.2           | <0.2           | <0.2                         | <0.2           |
| Tin                     | µg/g dw | -                                   | -                  | 0.1                      | 0.2                   | 0.2            | 0.1            | 0.4            | 0.2            | 0.8                  | 0.4            | 0.1            | 0.4            | 0.3            | 0.3                          | 0.4            |
| Titanium                | µg/g dw | -                                   | -                  | 0.5                      | 620                   | 690            | 470            | 640            | 660            | 190                  | 160            | 190            | 240            | 250            | 500                          | 490            |
| Uranium                 | µg/g dw | -                                   | -                  | 0.1                      | 2.4                   | 2.6            | 1.8            | 2.3            | 2.8            | 1.0                  | 1.2            | 0.8            | 1.1            | 1.4            | 3.8                          | 4.4            |
| Vanadium                | µg/g dw | -                                   | -                  | 0.1                      | 32                    | 35             | 23             | 31             | 34             | 9.3                  | 9.1            | 9.5            | 10             | 12             | 38                           | 41             |
| Zinc                    | µg/g dw | 123                                 | 315                | 0.5                      | 56                    | 60             | 42             | 51             | 61             | 16                   | 15             | 14             | 18             | 17             | 95                           | 120            |
| Radionuclides           |         |                                     |                    |                          |                       |                |                |                |                |                      |                |                |                |                |                              |                |
| Lead-210                | Bq/g dw | -                                   | -                  | 0.04                     | 0.07                  | 0.09           | <0.04          | <0.04          | 0.05           | <0.04                | <0.04          | <0.04          | <0.04          | <0.04          | 0.06                         | 0.09           |
| Polonium-210            | Bq/g dw | -                                   | -                  | 0.01                     | 0.15                  | 0.12           | 0.05           | 0.09           | 0.12           | 0.04                 | 0.02           | 0.01           | 0.04           | <0.01          | 0.11                         | 0.19           |
| Radium-226              | Bq/g dw | -                                   | -                  | 0.01                     | 0.05                  | 0.05           | 0.03           | 0.04           | 0.05           | <0.01                | 0.02           | 0.03           | 0.03           | 0.02           | 0.05                         | 0.04           |
| Thorium-228             | Bq/g dw | -                                   | -                  | 0.02                     | 0.05                  | 0.10           | 0.06           | 0.08           | 0.09           | <0.02                | <0.02          | <0.02          | 0.03           | 0.03           | 0.07                         | 0.07           |
| Thorium-230             | Bq/g dw | -                                   | -                  | 0.02                     | 0.06                  | 0.02           | 0.07           | 0.04           | 0.05           | 0.02                 | <0.02          | <0.02          | <0.02          | 0.02           | 0.05                         | 0.06           |
| Thorium-232             | Bq/g dw | -                                   | -                  | 0.02                     | 0.06                  | 0.08           | 0.05           | 0.06           | 0.07           | <0.02                | <0.02          | <0.02          | 0.03           | <0.02          | 0.05                         | 0.05           |

Table X.III-5  
Sediment Chemistry for Lakes in the Kiggavik Project Area, Fall 2009

| Parameter               | Units   | CCME Sediment<br>Quality Guidelines |                    | DL                       | Judge Sissons Lake Sub-Basin |                |                |                |                |                |                |                |                |                |                |                |
|-------------------------|---------|-------------------------------------|--------------------|--------------------------|------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                         |         |                                     |                    |                          | Judge Sissons Lake           |                |                |                |                |                |                |                |                |                |                |                |
|                         |         | ISQG <sup>(a)</sup>                 | PEL <sup>(b)</sup> |                          | JSL-SD001C-F09               | JSL-SD001D-F09 | JSL-SD001E-F09 | JSL-SD002A-F09 | JSL-SD002B-F09 | JSL-SD002C-F09 | JSL-SD002D-F09 | JSL-SD002E-F09 | JSL-SD006A-F09 | JSL-SD006B-F09 | JSL-SD006C-F09 | JSL-SD006D-F09 |
|                         |         |                                     |                    |                          | 19-Aug-09                    | 19-Aug-09      | 19-Aug-09      | 18-Aug-09      | 18-Aug-09      | 18-Aug-09      | 19-Aug-09      | 19-Aug-09      | 20-Aug-09      | 20-Aug-09      | 20-Aug-09      | 20-Aug-09      |
| Physical Properties     |         |                                     |                    |                          |                              |                |                |                |                |                |                |                |                |                |                |                |
| Gravel                  | %       | -                                   | -                  | 1.0                      | <1.0                         | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | 2              | 1              | 7              | 0              |
| Coarse Sand             | %       | -                                   | -                  | 1.0                      | <1.0                         | <1.0           | <1.0           | 1.0            | <1.0           | <1.0           | <1.0           | 14.0           | 65.0           | 57.0           | 61.0           | 35.0           |
| Fine Sand               | %       | -                                   | -                  | 1.0                      | 2.0                          | 2.0            | 2.0            | 4.0            | 6.0            | 4.0            | 3.0            | 13.0           | 24.0           | 23.0           | 26.0           | 61.0           |
| Silt                    | %       | -                                   | -                  | 1.0                      | 72.0                         | 72.0           | 73.0           | 74.0           | 72.0           | 75.0           | 74.0           | 52.0           | 7.0            | 16.0           | 4.0            | 4.0            |
| Clay                    | %       | -                                   | -                  | 1.0                      | 25.0                         | 26.0           | 24.0           | 21.0           | 22.0           | 21.0           | 23.0           | 21.0           | 1.0            | 3.0            | 1.0            | <1.0           |
| Moisture <sup>(c)</sup> | %       | -                                   | -                  | 0.1                      | 86.5                         | 85.6           | 87.6           | 87.3           | 81.9           | 84.9           | 87.6           | 77.9           | 44.1           | 54.6           | 33.7           | 37.5           |
| Moisture <sup>(d)</sup> | %       | -                                   | -                  | 0.01                     | 87.02                        | 86.73          | 87.29          | 85.88          | 83.80          | 87.10          | 74.30          | 79.45          | 31.71          | 49.33          | 32.06          | 76.74          |
| Loss on Ignition        | %       | -                                   | -                  | 0.1                      | 15.9                         | 15.7           | 15.6           | 16.9           | 16.4           | 17.2           | 17.1           | 11.2           | 2.1            | 4.1            | 1.2            | 1.0            |
| Nutrients               |         |                                     |                    |                          |                              |                |                |                |                |                |                |                |                |                |                |                |
| Nitrogen                | %       | -                                   | -                  | 0.02                     | 0.674                        | 0.674          | 0.691          | 0.703          | 0.661          | 0.738          | 0.721          | 0.451          | 0.041          | 0.086          | 0.061          | 0.179          |
| Phosphorus              | µg/g dw | -                                   | -                  | 1                        | 1,450                        | 1,350          | 1,420          | 1,530          | 1,600          | 1,880          | 1,870          | 2,130          | 350            | 320            | 330            | 560            |
| Total Organic Carbon    | %       | -                                   | -                  | 0.1                      | 7.08                         | 7.22           | 6.80           | 7.17           | 6.95           | 7.09           | 7.68           | 3.58           | 0.67           | 1.63           | 0.28           | 0.25           |
| Major Ions              |         |                                     |                    |                          |                              |                |                |                |                |                |                |                |                |                |                |                |
| Calcium                 | µg/g dw | -                                   | -                  | 1                        | 3,170                        | 3,190          | 3,360          | 3,040          | 2,580          | 2,960          | 2,810          | 2,660          | 1,220          | 1,230          | 1,200          | 2,360          |
| Magnesium               | µg/g dw | -                                   | -                  | 1                        | 5,990                        | 5,960          | 6,160          | 5,690          | 4,930          | 5,490          | 5,360          | 5,020          | 1,780          | 1,620          | 1,970          | 3,530          |
| Potassium               | µg/g dw | -                                   | -                  | 1                        | 5,390                        | 5,370          | 5,400          | 5,850          | 3,450          | 5,670          | 5,900          | 3,980          | 1,460          | 1,980          | 1,690          | 4,980          |
| Sodium                  | µg/g dw | -                                   | -                  | 1                        | 69                           | 71             | 90             | 87             | 24             | 79             | 94             | 40             | <1             | <1             | <1             | 30             |
| Sulfate, acid soluble   | µg/g dw | -                                   | -                  | 10                       | 3,800                        | 3,700          | 3,600          | 3,600          | 3,400          | 4,000          | 3,400          | 2,200          | <10            | 160            | 80             | 550            |
| Metals and Metalloids   |         |                                     |                    |                          |                              |                |                |                |                |                |                |                |                |                |                |                |
| Aluminum                | µg/g dw | -                                   | -                  | 20 or 300 <sup>(e)</sup> | 20,700                       | 21,100         | 21,800         | 23,200         | 15,700         | 21,300         | 21,400         | 16,300         | 4,800          | 5,700          | 5,400          | 14,900         |
| Antimony                | µg/g dw | -                                   | -                  | 0.2                      | <0.2                         | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           |
| Arsenic                 | µg/g dw | 5.9                                 | 17                 | 0.1                      | 13                           | 12             | 11             | 12             | 16             | 15             | 13             | 39             | 2.6            | 4.3            | 3.2            | 5.8            |
| Barium                  | µg/g dw | -                                   | -                  | 0.5                      | 250                          | 230            | 250            | 220            | 290            | 240            | 210            | 320            | 64             | 68             | 74             | 150            |
| Beryllium               | µg/g dw | -                                   | -                  | 0.1                      | 1.3                          | 1.2            | 1.3            | 1.3            | 1.0            | 1.2            | 1.2            | 1.2            | 0.3            | 0.3            | 0.3            | 0.6            |
| Boron                   | µg/g dw | -                                   | -                  | 1                        | <1                           | <1             | <1             | <1             | <1             | <1             | <1             | <1             | <1             | <1             | <1             | <1             |
| Cadmium                 | µg/g dw | 0.6                                 | 3.5                | 0.1                      | 0.4                          | 0.4            | 0.4            | 0.4            | 0.3            | 0.4            | 0.3            | 0.4            | <0.1           | <0.1           | <0.1           | <0.1           |
| Chromium                | µg/g dw | 37.3                                | 90.0               | 0.5                      | 31                           | 46             | 25             | 17             | 34             | 35             | 22             | 38             | 9.3            | 3.8            | 11             | 8.8            |
| Cobalt                  | µg/g dw | -                                   | -                  | 0.2                      | 6.8                          | 7.7            | 6.3            | 11             | 12             | 9.8            | 7.3            | 10             | 1.5            | 1.6            | 1.5            | 2.7            |
| Copper                  | µg/g dw | 35.7                                | 197                | 0.5                      | 38                           | 38             | 38             | 38             | 35             | 38             | 36             | 33             | 1.7            | 1.9            | 2.5            | 4.9            |
| Iron                    | µg/g dw | -                                   | -                  | 20 or 300 <sup>(e)</sup> | 29,200                       | 28,500         | 25,800         | 46,200         | 54,400         | 44,200         | 35,300         | 79,200         | 6,600          | 12,200         | 7,500          | 13,100         |
| Lead                    | µg/g dw | 35.0                                | 91.3               | 0.1                      | 13                           | 13             | 13             | 13             | 12             | 16             | 14             | 12             | 2.6            | 3.4            | 2.9            | 5.8            |
| Manganese               | µg/g dw | -                                   | -                  | 0.5                      | 270                          | 250            | 240            | 360            | 1060           | 360            | 260            | 720            | 50             | 280            | 57             | 99             |
| Mercury                 | µg/g dw | -                                   | -                  | 0.05                     | <0.05                        | <0.05          | <0.05          | <0.05          | 0.06           | <0.05          | <0.05          | <0.05          | <0.05          | <0.05          | <0.05          | <0.05          |
| Molybdenum              | µg/g dw | -                                   | -                  | 0.1                      | 2.5                          | 2.6            | 2.3            | 2.7            | 3.0            | 3.1            | 2.3            | 4.9            | 0.2            | 0.5            | 0.2            | 0.4            |
| Nickel                  | µg/g dw | -                                   | -                  | 0.1                      | 34                           | 36             | 32             | 36             | 71             | 35             | 32             | 32             | 5.0            | 5.1            | 5.5            | 11             |
| Selenium                | µg/g dw | -                                   | -                  | 0.1                      | 0.8                          | 0.8            | 0.8            | 0.7            | 0.8            | 1.0            | 0.9            | 0.7            | <0.1           | <0.1           | <0.1           | 0.1            |
| Silver                  | µg/g dw | -                                   | -                  | 0.1                      | 0.2                          | 0.2            | 0.2            | 0.2            | 0.2            | 0.2            | 0.2            | 0.2            | <0.1           | <0.1           | <0.1           | <0.1           |
| Strontium               | µg/g dw | -                                   | -                  | 0.5                      | 150                          | 140            | 160            | 160            | 110            | 150            | 160            | 120            | 51             | 67             | 56             | 110            |
| Thallium                | µg/g dw | -                                   | -                  | 0.2                      | <0.2                         | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           |
| Tin                     | µg/g dw | -                                   | -                  | 0.1                      | 0.3                          | 1.0            | <0.1           | 1.0            | 0.1            | 0.3            | 0.4            | 1.6            | 0.4            | 0.2            | 0.5            | 0.4            |
| Titanium                | µg/g dw | -                                   | -                  | 0.5                      | 470                          | 450            | 470            | 460            | 350            | 460            | 500            | 360            | 180            | 210            | 170            | 390            |
| Uranium                 | µg/g dw | -                                   | -                  | 0.1                      | 4.2                          | 4.3            | 4.3            | 4.0            | 4.0            | 5.8            | 3.8            | 3.8            | 0.7            | 1.0            | 0.8            | 1.5            |
| Vanadium                | µg/g dw | -                                   | -                  | 0.1                      | 39                           | 39             | 39             | 36             | 33             | 39             | 37             | 36             | 9.8            | 11             | 10             | 21             |
| Zinc                    | µg/g dw | 123                                 | 315                | 0.5                      | 120                          | 120            | 110            | 99             | 100            | 110            | 100            | 110            | 14             | 20             | 16             | 31             |
| Radionuclides           |         |                                     |                    |                          |                              |                |                |                |                |                |                |                |                |                |                |                |
| Lead-210                | Bq/g dw | -                                   | -                  | 0.04                     | 0.07                         | 0.11           | 0.11           | 0.09           | 0.09           | 0.18           | 0.19           | 0.06           | <0.04          | <0.04          | <0.04          | 0.07           |
| Polonium-210            | Bq/g dw | -                                   | -                  | 0.01                     | 0.09                         | 0.08           | 0.08           | 0.12           | 0.11           | 0.28           | 0.15           | 0.08           | 0.04           | 0.06           | 0.05           | 0.11           |
| Radium-226              | Bq/g dw | -                                   | -                  | 0.01                     | 0.04                         | 0.07           | 0.04           | 0.03           | 0.03           | 0.05           | 0.04           | 0.03           | 0.03           | 0.03           | <0.01          | 0.02           |
| Thorium-228             | Bq/g dw | -                                   | -                  | 0.02                     | 0.08                         | 0.06           | 0.10           | 0.06           | 0.07           | 0.07           | 0.08           | <0.02          | <0.02          | 0.04           | 0.03           | 0.05           |
| Thorium-230             | Bq/g dw | -                                   | -                  | 0.02                     | 0.04                         | 0.05           | 0.06           | 0.06           | 0.05           | 0.06           | 0.04           | <0.02          | <0.02          | 0.03           | <0.02          | 0.03           |
| Thorium-232             | Bq/g dw | -                                   | -                  | 0.02                     | 0.07                         | 0.06           | 0.06           | 0.07           | 0.05           | 0.06           | 0.06           | <0.02          | <0.02          | 0.03           | 0.02           | 0.05           |

Table X.III-5  
Sediment Chemistry for Lakes in the Kiggavik Project Area, Fall 2009

| Parameter               | Units   | CCME Sediment<br>Quality Guidelines |                    | DL                       | Judge Sissons Lake Sub-Basin |                |                |                |                |                |                |                |                |                |                |  |
|-------------------------|---------|-------------------------------------|--------------------|--------------------------|------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--|
|                         |         |                                     |                    |                          | Judge Sissons Lake           |                |                |                |                |                |                |                |                |                |                |  |
|                         |         | ISQG <sup>(a)</sup>                 | PEL <sup>(b)</sup> |                          | JSL-SD006E-F09               | JSL-SD007A-F09 | JSL-SD007B-F09 | JSL-SD007C-F09 | JSL-SD007D-F09 | JSL-SD007E-F09 | JSL-SD008A-F09 | JSL-SD008B-F09 | JSL-SD008C-F09 | JSL-SD008D-F09 | JSL-SD008E-F09 |  |
|                         |         |                                     |                    |                          | 20-Aug-09                    | 21-Aug-09      | 21-Aug-09      | 21-Aug-09      | 21-Aug-09      | 21-Aug-09      | 22-Aug-09      | 22-Aug-09      | 22-Aug-09      | 22-Aug-09      | 22-Aug-09      |  |
| Physical Properties     |         |                                     |                    |                          |                              |                |                |                |                |                |                |                |                |                |                |  |
| Gravel                  | %       | -                                   | -                  | 1.0                      | 6                            | 4              | 6              | 3              | 2              | 1              | <1.0           | 1              | <1.0           | 1              | <1.0           |  |
| Coarse Sand             | %       | -                                   | -                  | 1.0                      | 48.0                         | 60.0           | 64.0           | 26.0           | 42.0           | 44.0           | 40.0           | 55.0           | 52.0           | 69.0           | 27.0           |  |
| Fine Sand               | %       | -                                   | -                  | 1.0                      | 41.0                         | 29.0           | 27.0           | 39.0           | 39.0           | 40.0           | 28.0           | 24.0           | 28.0           | 10.0           | 57.0           |  |
| Silt                    | %       | -                                   | -                  | 1.0                      | 5.0                          | 5.0            | 3.0            | 26.0           | 15.0           | 12.0           | 28.0           | 18.0           | 18.0           | 17.0           | 15.0           |  |
| Clay                    | %       | -                                   | -                  | 1.0                      | <1.0                         | 1.0            | 1.0            | 4.0            | 2.0            | 2.0            | 4.0            | 2.0            | 2.0            | 3.0            | 2.0            |  |
| Moisture <sup>(c)</sup> | %       | -                                   | -                  | 0.1                      | 36.4                         | 32.7           | 28.2           | 63.3           | 34.9           | 49.0           | 46.6           | 61.3           | 50.4           | 49.1           | 47.5           |  |
| Moisture <sup>(d)</sup> | %       | -                                   | -                  | 0.01                     | 37.59                        | 34.23          | 27.51          | 50.70          | 31.03          | 39.21          | 53.06          | 46.32          | 54.98          | 51.76          | 46.91          |  |
| Loss on Ignition        | %       | -                                   | -                  | 0.1                      | 1.7                          | 1.8            | 1.1            | 6.4            | 2.6            | 2.7            | 5.8            | 4.0            | 4.5            | 4.3            | 3.2            |  |
| Nutrients               |         |                                     |                    |                          |                              |                |                |                |                |                |                |                |                |                |                |  |
| Nitrogen                | %       | -                                   | -                  | 0.02                     | 0.095                        | 0.073          | 0.044          | 0.265          | 0.104          | 0.094          | 0.204          | 0.157          | 0.186          | 0.222          | 0.095          |  |
| Phosphorus              | µg/g dw | -                                   | -                  | 1                        | 470                          | 420            | 390            | 620            | 460            | 430            | 600            | 490            | 520            | 600            | 470            |  |
| Total Organic Carbon    | %       | -                                   | -                  | 0.1                      | 0.48                         | 0.67           | 0.24           | 2.57           | 0.95           | 0.97           | 2.59           | 1.79           | 2.10           | 1.90           | 1.56           |  |
| Major Ions              |         |                                     |                    |                          |                              |                |                |                |                |                |                |                |                |                |                |  |
| Calcium                 | µg/g dw | -                                   | -                  | 1                        | 1,800                        | 1,560          | 1,540          | 2,780          | 2,190          | 1,880          | 2,960          | 2,210          | 2,450          | 2,440          | 1,920          |  |
| Magnesium               | µg/g dw | -                                   | -                  | 1                        | 3,310                        | 2,360          | 2,140          | 3,790          | 2,810          | 2,450          | 4,190          | 3,160          | 3,630          | 3,630          | 2,050          |  |
| Potassium               | µg/g dw | -                                   | -                  | 1                        | 4,890                        | 2,370          | 3,360          | 5,080          | 3,970          | 3,590          | 3,910          | 2,360          | 2,800          | 2,070          | 1,710          |  |
| Sodium                  | µg/g dw | -                                   | -                  | 1                        | 30                           | <1             | 1,180          | 30             | 16             | 13             | 60             | 4              | 9              | <1             | <1             |  |
| Sulfate, acid soluble   | µg/g dw | -                                   | -                  | 10                       | 190                          | 80             | <10            | 1,000          | 250            | 200            | 840            | 460            | 480            | 760            | 220            |  |
| Metals and Metalloids   |         |                                     |                    |                          |                              |                |                |                |                |                |                |                |                |                |                |  |
| Aluminum                | µg/g dw | -                                   | -                  | 20 or 300 <sup>(e)</sup> | 12,600                       | 7,600          | 9,000          | 16,200         | 12,300         | 10,700         | 12,900         | 8,500          | 10,300         | 8,600          | 6,000          |  |
| Antimony                | µg/g dw | -                                   | -                  | 0.2                      | <0.2                         | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           |  |
| Arsenic                 | µg/g dw | 5.9                                 | 17                 | 0.1                      | 5.5                          | 4.5            | 5.1            | 5.8            | 4.1            | 4.6            | 3.6            | 2.6            | 2.7            | 3.9            | 2.1            |  |
| Barium                  | µg/g dw | -                                   | -                  | 0.5                      | 140                          | 75             | 86             | 160            | 110            | 100            | 120            | 84             | 92             | 89             | 67             |  |
| Beryllium               | µg/g dw | -                                   | -                  | 0.1                      | 0.5                          | 0.4            | 0.4            | 0.7            | 0.4            | 0.4            | 0.5            | 0.3            | 0.4            | 0.4            | 0.2            |  |
| Boron                   | µg/g dw | -                                   | -                  | 1                        | <1                           | <1             | <1             | <1             | <1             | <1             | <1             | <1             | <1             | <1             | <1             |  |
| Cadmium                 | µg/g dw | 0.6                                 | 3.5                | 0.1                      | <0.1                         | <0.1           | <0.1           | <0.1           | <0.1           | <0.1           | <0.1           | <0.1           | <0.1           | <0.1           | <0.1           |  |
| Chromium                | µg/g dw | 37.3                                | 90.0               | 0.5                      | 7.6                          | 10             | 4.1            | 12             | 11             | 6.1            | 16             | 16             | 17             | 18             | 7.8            |  |
| Cobalt                  | µg/g dw | -                                   | -                  | 0.2                      | 2.7                          | 2.0            | 1.8            | 3.3            | 2.5            | 2.2            | 3.8            | 2.7            | 3.1            | 3.3            | 1.8            |  |
| Copper                  | µg/g dw | 35.7                                | 197                | 0.5                      | 3.1                          | 2.6            | 2.1            | 6.8            | 4.3            | 3.3            | 6.5            | 4.2            | 5.1            | 6.3            | 2.8            |  |
| Iron                    | µg/g dw | -                                   | -                  | 20 or 300 <sup>(e)</sup> | 13,200                       | 10,900         | 10,400         | 14,100         | 9,800          | 10,600         | 12,600         | 11,000         | 11,700         | 12,900         | 8,200          |  |
| Lead                    | µg/g dw | 35.0                                | 91.3               | 0.1                      | 5.1                          | 3.7            | 3.8            | 6.2            | 4.2            | 3.7            | 5.3            | 3.7            | 4.0            | 4.7            | 2.6            |  |
| Manganese               | µg/g dw | -                                   | -                  | 0.5                      | 110                          | 73             | 72             | 130            | 86             | 110            | 110            | 97             | 99             | 100            | 92             |  |
| Mercury                 | µg/g dw | -                                   | -                  | 0.05                     | <0.05                        | <0.05          | <0.05          | <0.05          | <0.05          | <0.05          | <0.05          | <0.05          | <0.05          | <0.05          | <0.05          |  |
| Molybdenum              | µg/g dw | -                                   | -                  | 0.1                      | 0.5                          | 0.5            | 0.3            | 0.5            | 0.4            | 0.3            | 0.4            | 0.2            | 0.4            | 0.3            | 0.2            |  |
| Nickel                  | µg/g dw | -                                   | -                  | 0.1                      | 8.5                          | 7.0            | 5.3            | 13             | 9.5            | 7.7            | 14             | 10             | 12             | 12             | 6.8            |  |
| Selenium                | µg/g dw | -                                   | -                  | 0.1                      | <0.1                         | <0.1           | <0.1           | 0.1            | <0.1           | <0.1           | 0.1            | <0.1           | <0.1           | 0.1            | <0.1           |  |
| Silver                  | µg/g dw | -                                   | -                  | 0.1                      | <0.1                         | <0.1           | <0.1           | <0.1           | <0.1           | <0.1           | <0.1           | <0.1           | <0.1           | <0.1           | <0.1           |  |
| Strontium               | µg/g dw | -                                   | -                  | 0.5                      | 110                          | 72             | 160            | 120            | 100            | 84             | 94             | 70             | 74             | 74             | 47             |  |
| Thallium                | µg/g dw | -                                   | -                  | 0.2                      | <0.2                         | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           | <0.2           |  |
| Tin                     | µg/g dw | -                                   | -                  | 0.1                      | 0.6                          | 0.4            | 0.3            | 0.9            | 0.2            | 0.2            | 0.2            | 0.2            | 0.2            | 0.3            | 0.1            |  |
| Titanium                | µg/g dw | -                                   | -                  | 0.5                      | 350                          | 250            | 260            | 450            | 350            | 320            | 480            | 360            | 400            | 350            | 290            |  |
| Uranium                 | µg/g dw | -                                   | -                  | 0.1                      | 1.1                          | 1.0            | 0.9            | 1.6            | 1.2            | 1.0            | 1.4            | 0.8            | 1.0            | 1.1            | 0.7            |  |
| Vanadium                | µg/g dw | -                                   | -                  | 0.1                      | 19                           | 15             | 13             | 24             | 18             | 16             | 23             | 18             | 20             | 20             | 12             |  |
| Zinc                    | µg/g dw | 123                                 | 315                | 0.5                      | 27                           | 19             | 15             | 36             | 23             | 20             | 39             | 28             | 32             | 32             | 19             |  |
| Radionuclides           |         |                                     |                    |                          |                              |                |                |                |                |                |                |                |                |                |                |  |
| Lead-210                | Bq/g dw | -                                   | -                  | 0.04                     | <0.04                        | <0.04          | <0.04          | <0.04          | <0.04          | <0.04          | <0.04          | <0.04          | <0.04          | <0.04          | <0.04          |  |
| Polonium-210            | Bq/g dw | -                                   | -                  | 0.01                     | 0.06                         | 0.04           | 0.02           | 0.09           | 0.02           | 0.04           | 0.06           | 0.07           | 0.06           | 0.07           | 0.06           |  |
| Radium-226              | Bq/g dw | -                                   | -                  | 0.01                     | 0.03                         | 0.02           | 0.03           | 0.03           | 0.03           | 0.02           | 0.03           | 0.02           | 0.02           | 0.04           | 0.04           |  |
| Thorium-228             | Bq/g dw | -                                   | -                  | 0.02                     | 0.04                         | 0.04           | 0.03           | 0.05           | 0.06           | <0.02          | 0.03           | <0.02          | 0.03           | 0.02           | <0.02          |  |
| Thorium-230             | Bq/g dw | -                                   | -                  | 0.02                     | 0.02                         | <0.02          | 0.03           | 0.03           | <0.02          | <0.02          | 0.02           | <0.02          | 0.02           | <0.02          | 0.02           |  |
| Thorium-232             | Bq/g dw | -                                   | -                  | 0.02                     | 0.03                         | 0.02           | 0.04           | 0.03           | 0.04           | <0.02          | <0.02          | <0.02          | 0.02           | 0.03           | 0.02           |  |

Notes: Values greater than or equal to ISQGs are bolded.  
Values greater than or equal to PELs are bolded and underlined.  
Non-detect values that have detection limits that are greater than guidelines are italicized.  
<sup>(a)</sup> = ISQG = Interim Freshwater Sediment Quality Guidelines (CCME 2002).  
<sup>(b)</sup> = PEL = Probable Effect Levels (CCME 2002).  
<sup>(c)</sup> = Moisture content measured on sample analyzed for particle size.  
<sup>(d)</sup> = Moisture content measured on sample analyzed for chemistry.  
<sup>(e)</sup> = Detection limit for aluminum and iron was either 20 or 300 µg/g dw, depending on the sample.  
CCME = Canadian Council of Ministers of the Environment; DL = detection limit; % = percentage; µg/g dw = micrograms per gram dry weight; Bq/g dw = Becquerels per gram in dry weight; - = no data collected; Aug = August; < = less than.

Table X.III-6  
Selected<sup>(a)</sup> Sediment Chemistry Results for Baker Lake, September 2008 and August 2009

| Parameter                              | Units | CCME Guideline |      | Thompson et al. (2004) values |            | DL    | 2008   |        |        |        |        | 2009   |        |
|----------------------------------------|-------|----------------|------|-------------------------------|------------|-------|--------|--------|--------|--------|--------|--------|--------|
|                                        |       | ISQG           | PEL  | LEL                           | SEL        |       | Site 1 | Site 2 | Site 3 | Site 4 | Site 5 | Site 1 | Site 2 |
| Nutrients                              |       |                |      |                               |            |       |        |        |        |        |        |        |        |
| Phosphorus                             | µg/g  | -              | -    | -                             | -          | 1     | 310    | 590    | 330    | 570    | 830    | -      | -      |
| Major Ions                             |       |                |      |                               |            |       |        |        |        |        |        |        |        |
| Calcium                                | µg/g  | -              | -    | -                             | -          | 1     | 2,190  | 3,070  | 2,020  | 3,710  | 4,200  | -      | -      |
| Magnesium                              | µg/g  | -              | -    | -                             | -          | 1     | 4,310  | 4,620  | 5,070  | 4,830  | 6,760  | -      | -      |
| Potassium                              | µg/g  | -              | -    | -                             | -          | 1     | 5,030  | 6,710  | 7,640  | 6,580  | 8,660  | -      | -      |
| Sodium                                 | µg/g  | -              | -    | -                             | -          | 1     | 300    | 370    | 380    | 400    | 490    | -      | -      |
| Metals                                 |       |                |      |                               |            |       |        |        |        |        |        |        |        |
| Aluminum                               | µg/g  | -              | -    | -                             | -          | 20    | 11,600 | 15,100 | 16,200 | 19,400 | 28,400 | 18,000 | 10,600 |
| Arsenic                                | µg/g  | 5.9            | 17   | -                             | -          | 0.1   | 2      | 6.6    | 3.7    | 7.4    | 8.9    | 9.1    | 6.1    |
| Barium                                 | µg/g  | -              | -    | -                             | -          | 0.5   | 91     | 340    | 190    | 190    | 160    | 150    | 180    |
| Beryllium                              | µg/g  | -              | -    | -                             | -          | 0.1   | 0.4    | 0.6    | 0.6    | 0.7    | 1.1    | 0.6    | 0.4    |
| Boron                                  | µg/g  | -              | -    | -                             | -          | 1     | <1     | <1     | <1     | <1     | 150    | <1     | <1     |
| Chromium                               | µg/g  | 37.3           | 90   | -                             | -          | 0.5   | 89     | 21     | 83     | 26     | 19     | 19     | 11     |
| Cobalt                                 | µg/g  | -              | -    | -                             | -          | 0.2   | 3.2    | 4.2    | 4      | 5.1    | 7.5    | 5.9    | 3.3    |
| Copper                                 | µg/g  | 35.7           | 197  | -                             | -          | 0.5   | 3.6    | 4.5    | 3.3    | 7      | 7.8    | 6.9    | 3.6    |
| Iron                                   | µg/g  | -              | -    | -                             | -          | 20    | 10,300 | 12,500 | 12,100 | 18,600 | 18,200 | 18,100 | 10,600 |
| Lead                                   | µg/g  | 35             | 91.3 | -                             | -          | 0.1   | 4      | 5      | 3.7    | 8.6    | 12     | 7.3    | 3.1    |
| Manganese                              | µg/g  | -              | -    | -                             | -          | 0.5   | 120    | 680    | 120    | 220    | 49     | 1,720  | 130    |
| Molybdenum                             | µg/g  | -              | -    | -                             | -          | 0.1   | <0.1   | <0.1   | <0.1   | <0.1   | 1.2    | 1.3    | 0.3    |
| Nickel                                 | µg/g  | -              | -    | -                             | -          | 0.1   | 11     | 12     | 17     | 13     | 16     | 13     | 9.8    |
| Strontium                              | µg/g  | -              | -    | -                             | -          | 0.5   | 52     | 67     | 58     | 150    | 130    | 83     | 48     |
| Titanium                               | µg/g  | -              | -    | -                             | -          | 20    | 490    | 600    | 430    | 710    | 1,200  | 750    | 330    |
| Uranium                                | µg/g  | -              | -    | -                             | -          | 0.1   | 5.6    | 8.3    | 10     | 7.8    | 2.5    | 1.9    | 0.8    |
| Vanadium                               | µg/g  | -              | -    | -                             | -          | 0.1   | 19     | 24     | 25     | 45     | 53     | 30     | 16     |
| Zinc                                   | µg/g  | 123            | 315  | -                             | -          | 0.5   | 27     | 26     | 24     | 34     | 46     | 30     | 16     |
| Radionuclides                          |       |                |      |                               |            |       |        |        |        |        |        |        |        |
| Lead-210                               | Bq/g  | -              | -    | 0.5 - 0.9                     | 9.7 - 20.8 | 0.02  | <0.02  | 0.02   | <0.02  | 0.03   | 0.09   | -      | -      |
| Polonium-210                           | Bq/g  | -              | -    | 0.6 - 0.8                     | 8.7 - 12.1 | 0.005 | 0.008  | 0.06   | 0.02   | 0.04   | 0.08   | -      | -      |
| Radium-226                             | Bq/g  | -              | -    | 0.1 0.6                       | 13 - 14.4  | 0.01  | 0.03   | 0.03   | 0.04   | 0.06   | 0.04   | -      | -      |
| Thorium-230                            | Bq/g  | -              | -    | -                             | -          | 0.02  | 0.02   | 0.04   | 0.02   | 0.05   | 0.08   | -      | -      |
| Polycyclic Aromatic Hydrocarbons (PAH) |       |                |      |                               |            |       |        |        |        |        |        |        |        |
| Total PAH                              | µg/g  | -              | -    | -                             | -          | -     | <0.1   | <0.1   | <0.1   | <0.1   | <0.1   | -      | -      |
| Acenaphthene                           | µg/g  | 6.71           | 88.9 | -                             | -          | 0.01  | <0.01  | <0.01  | <0.01  | <0.01  | <0.01  | -      | -      |
| Acenaphthylene                         | µg/g  | 5.87           | 128  | -                             | -          | 0.01  | <0.01  | <0.01  | <0.01  | <0.01  | <0.01  | -      | -      |
| Anthracene                             | µg/g  | 46.9           | 245  | -                             | -          | 0.01  | <0.01  | <0.01  | <0.01  | <0.01  | <0.01  | -      | -      |
| Benzo(a)anthracene                     | µg/g  | 31.7           | 385  | -                             | -          | 0.02  | <0.02  | <0.02  | <0.02  | <0.02  | <0.02  | -      | -      |
| Benzo(a)pyrene                         | µg/g  | 31.9           | 782  | -                             | -          | 0.1   | <0.1   | <0.1   | <0.1   | <0.1   | <0.1   | -      | -      |
| Chrysene                               | µg/g  | 57.1           | 862  | -                             | -          | 0.02  | <0.02  | <0.02  | <0.02  | <0.02  | <0.02  | -      | -      |
| Dibenzo(a,h)anthracene                 | µg/g  | 6.22           | 135  | -                             | -          | 0.1   | <0.1   | <0.1   | <0.1   | <0.1   | <0.1   | -      | -      |
| Fluoranthene                           | µg/g  | 111            | 2355 | -                             | -          | 0.01  | <0.01  | <0.01  | <0.01  | <0.01  | <0.01  | -      | -      |
| Fluorene                               | µg/g  | 21.2           | 144  | -                             | -          | 0.01  | <0.01  | <0.01  | <0.01  | <0.01  | <0.01  | -      | -      |
| Naphthalene                            | µg/g  | 34.6           | 391  | -                             | -          | 0.01  | <0.01  | <0.01  | <0.01  | <0.01  | <0.01  | -      | -      |
| Phenanthrene                           | µg/g  | 41.9           | 515  | -                             | -          | 0.01  | 0.01   | 0.03   | <0.01  | <0.01  | <0.01  | -      | -      |
| Pyrene                                 | µg/g  | 53             | 875  | -                             | -          | 0.01  | <0.01  | <0.01  | 0.01   | 0.01   | <0.01  | -      | -      |

<sup>(a)</sup> = Selected sediment chemistry parameters include those having Canadian Council of Ministers of the Environment (CCME) sediment quality guidelines for the protection of aquatic life (CCME 2002) and those parameters which had concentrations greater than ten times the detection limit.

Reported concentrations are mean values (n = 2).

Bold values exceeded CCME Interim Sediment Quality Guidelines (ISQG) but not the Probable Effect Level (PEL).

Bq/g = Becquerels per gram; µg/g = micrograms per gram; < = less than; LEL = lowest effects level; SEL = severe effects level; DL = detection limit; - = no data collected.

## **SRC ANALYTICAL**

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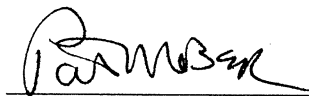
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DEC 02 2008

Jacques Whitford Axys  
4370 Dominion St.  
Burnaby, BC V5G 4L7  
Attn: Janine Beckett

Date Samples Received: Sep-26-2008      Client P.O.: 1038926

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Analysis has been reviewed by:



Pat Moser  
Organics Supervisor



Jeff Zimmer  
Inorganics Supervisor



Dave Chorney  
Radiochemistry and SLOWPOKE II Supervisor

- \* Test methods and data are validated by the laboratory's Quality Assurance Program.
- \* Routine methods follow recognized procedures from sources such as
  - \* Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
  - \* Environment Canada
  - \* US EPA
  - \* CANMET
- \* The results reported relate only to the test samples as provided by the client.
- \* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.
- \* Additional information is available upon request.

**SRC ANALYTICAL**

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Jacques Whitford Axys  
 4370 Dominion St.  
 Burnaby, BC V5G 4L7  
 Attn: Janine Beckett

Nov-26-2008

Date Samples Received: Sep-26-2008 Client P.O.: 1038926

| SAMPLE | CLIENT DESCRIPTION                      |
|--------|-----------------------------------------|
| 39657  | 9/18/2008 2:00:00 PM SITE 1 *SEDIMENT*  |
| 39658  | 9/18/2008 12:00:00 PM SITE 2 *SEDIMENT* |
| 39659  | 9/18/2008 10:00:00 AM SITE 3 *SEDIMENT* |

| ANALYTE                  | UNITS    | 39657<br>site 1 | 39658<br>site 2 | 39659<br>site 3 |
|--------------------------|----------|-----------------|-----------------|-----------------|
| INORGANIC CHEMISTRY      |          |                 |                 |                 |
| Chloride, water soluble  | ug/g     | <100            | <100            | <100            |
| pH                       | pH units | 7.20 1:1slurry  | 6.40 1:1slurry  | 7.25 1:1slurry  |
| Specific conductivity    | uS/cm    | 190             | 250             | 200             |
| Ammonia as nitrogen      | ug/g     | 5               | 14              | 20              |
| Nitrite+Nitrate nitrogen | ug/g     | 7               | 7               | 9               |
| Total Kjeldahl nitrogen  | ug/g     | 49              | 220             | 36              |
| Aluminum                 | ug/g     | 11600           | 15100           | 16200           |
| Antimony                 | ug/g     | <0.2            | <0.2            | <0.2            |
| Arsenic                  | ug/g     | 2.0             | 6.6             | 3.7             |
| Barium                   | ug/g     | 91              | 340             | 190             |
| Beryllium                | ug/g     | 0.4             | 0.6             | 0.6             |
| Boron                    | ug/g     | <1              | <1              | <1              |
| Cadmium                  | ug/g     | <0.1            | <0.1            | <0.1            |
| Calcium                  | ug/g     | 2190            | 3070            | 2020            |
| Chromium                 | ug/g     | 89              | 21              | 83              |
| Cobalt                   | ug/g     | 3.2             | 4.2             | 4.0             |
| Copper                   | ug/g     | 3.6             | 4.5             | 3.3             |
| Iron                     | ug/g     | 10300           | 12500           | 12100           |
| Lead                     | ug/g     | 4.0             | 5.0             | 3.7             |
| Magnesium                | ug/g     | 4310            | 4620            | 5070            |
| Manganese                | ug/g     | 120             | 680             | 120             |
| Molybdenum               | ug/g     | <0.1            | <0.1            | <0.1            |
| Nickel                   | ug/g     | 11              | 12              | 17              |
| Phosphorus               | ug/g     | 310             | 590             | 330             |
| Potassium                | ug/g     | 5030            | 6710            | 7640            |
| Selenium                 | ug/g     | <0.1            | 0.1             | 0.1             |
| Silver                   | ug/g     | <0.1            | 0.1             | <0.1            |
| Sodium                   | ug/g     | 300             | 370             | 380             |
| Strontium                | ug/g     | 52              | 67              | 58              |
| Thallium                 | ug/g     | <0.2            | <0.2            | <0.2            |
| Tin                      | ug/g     | <0.1            | <0.1            | <0.1            |
| Titanium                 | ug/g     | 490             | 600             | 430             |
| Uranium                  | ug/g     | 5.6             | 8.3             | 10              |
| Vanadium                 | ug/g     | 19              | 24              | 25              |

**SRC ANALYTICAL**

Jacques Whitford Axys

Nov-26-2008

| SAMPLE                  |                       | CLIENT DESCRIPTION |                |                |       |
|-------------------------|-----------------------|--------------------|----------------|----------------|-------|
| 39657                   | 9/18/2008 2:00:00 PM  | SITE 1             | *SEDIMENT*     |                |       |
| 39658                   | 9/18/2008 12:00:00 PM | SITE 2             | *SEDIMENT*     |                |       |
| 39659                   | 9/18/2008 10:00:00 AM | SITE 3             | *SEDIMENT*     |                |       |
| ANALYTE                 |                       | UNITS              | 39657          | 39658          | 39659 |
| Zinc                    |                       |                    |                |                |       |
|                         | ug/g                  | 27                 | 26             | 24             |       |
| Sulfate, acid soluble   |                       |                    |                |                |       |
|                         | ug/g                  | 150                | 390            | 160            |       |
| Time charge             |                       |                    |                |                |       |
|                         | --                    | see attachment     | see attachment | see attachment |       |
| RADIO CHEMISTRY         |                       |                    |                |                |       |
| Lead-210                |                       |                    |                |                |       |
|                         | Bq/g                  | <0.02              | 0.02           | <0.02          |       |
| Polonium-210            |                       |                    |                |                |       |
|                         | Bq/g                  | 0.008              | 0.06           | 0.02           |       |
| Radium-226              |                       |                    |                |                |       |
|                         | Bq/g                  | 0.03               | 0.03           | 0.04           |       |
| Thorium-230             |                       |                    |                |                |       |
|                         | Bq/g                  | 0.02               | 0.04           | 0.02           |       |
| ORGANIC CHEMISTRY       |                       |                    |                |                |       |
| Acenaphthene            |                       |                    |                |                |       |
|                         | ug/g                  | <0.01              | <0.01          | <0.01          |       |
| Acenaphthylene          |                       |                    |                |                |       |
|                         | ug/g                  | <0.01              | <0.01          | <0.01          |       |
| Anthracene              |                       |                    |                |                |       |
|                         | ug/g                  | <0.01              | <0.01          | <0.01          |       |
| Benzo(a)anthracene      |                       |                    |                |                |       |
|                         | ug/g                  | <0.02              | <0.02          | <0.02          |       |
| Benzo(a)pyrene          |                       |                    |                |                |       |
|                         | ug/g                  | <0.1               | <0.1           | <0.1           |       |
| Benzo(b)fluoranthene    |                       |                    |                |                |       |
|                         | ug/g                  | <0.1               | <0.1           | <0.1           |       |
| Benzo(e)pyrene          |                       |                    |                |                |       |
|                         | ug/g                  | <0.1               | <0.1           | <0.1           |       |
| Benzo(g,h,i)perylene    |                       |                    |                |                |       |
|                         | ug/g                  | <0.1               | <0.1           | <0.1           |       |
| Benzo(k)fluoranthene    |                       |                    |                |                |       |
|                         | ug/g                  | <0.1               | <0.1           | <0.1           |       |
| Chrysene                |                       |                    |                |                |       |
|                         | ug/g                  | <0.02              | <0.02          | <0.02          |       |
| Dibenzo(a,h)anthracene  |                       |                    |                |                |       |
|                         | ug/g                  | <0.1               | <0.1           | <0.1           |       |
| Fluoranthene            |                       |                    |                |                |       |
|                         | ug/g                  | <0.01              | <0.01          | <0.01          |       |
| Fluorene                |                       |                    |                |                |       |
|                         | ug/g                  | <0.01              | <0.01          | <0.01          |       |
| Indeno(1,2,3-c,d)pyrene |                       |                    |                |                |       |
|                         | ug/g                  | <0.1               | <0.1           | <0.1           |       |
| Naphthalene             |                       |                    |                |                |       |
|                         | ug/g                  | <0.01              | <0.01          | <0.01          |       |
| Perylene                |                       |                    |                |                |       |
|                         | ug/g                  | <0.1               | <0.1           | <0.1           |       |
| Phenanthrene            |                       |                    |                |                |       |
|                         | ug/g                  | 0.01               | 0.03           | <0.01          |       |
| Pyrene                  |                       |                    |                |                |       |
|                         | ug/g                  | <0.01              | <0.01          | 0.01           |       |

| SAMPLE |                       | CLIENT DESCRIPTION |            |  |
|--------|-----------------------|--------------------|------------|--|
| 39660  | 9/21/2008 12:00:00 PM | SITE 4             | *SEDIMENT* |  |

| ANALYTE                  |  | UNITS    | 39660          |
|--------------------------|--|----------|----------------|
| INORGANIC CHEMISTRY      |  |          |                |
| Chloride, water soluble  |  |          |                |
|                          |  | ug/g     | <100           |
| pH                       |  |          |                |
|                          |  | pH units | 6.25 1:1slurry |
| Specific conductivity    |  |          |                |
|                          |  | uS/cm    | 360            |
| Ammonia as nitrogen      |  |          |                |
|                          |  | ug/g     | 46             |
| Nitrite+Nitrate nitrogen |  |          |                |
|                          |  | ug/g     | 20             |
| Total Kjeldahl nitrogen  |  |          |                |
|                          |  | ug/g     | 350            |

**SRC ANALYTICAL**

Jacques Whitford Axys

Nov-26-2008

| SAMPLE | CLIENT DESCRIPTION                      |
|--------|-----------------------------------------|
| 39660  | 9/21/2008 12:00:00 PM SITE 4 *SEDIMENT* |

| ANALYTE               | UNITS | 39660          |
|-----------------------|-------|----------------|
| Aluminum              | ug/g  | 19400          |
| Antimony              | ug/g  | <0.2           |
| Arsenic               | ug/g  | 7.4            |
| Barium                | ug/g  | 190            |
| Beryllium             | ug/g  | 0.7            |
| Boron                 | ug/g  | <1             |
| Cadmium               | ug/g  | <0.1           |
| Calcium               | ug/g  | 3710           |
| Chromium              | ug/g  | 26             |
| Cobalt                | ug/g  | 5.1            |
| Copper                | ug/g  | 7.0            |
| Iron                  | ug/g  | 18600          |
| Lead                  | ug/g  | 8.6            |
| Magnesium             | ug/g  | 4830           |
| Manganese             | ug/g  | 220            |
| Molybdenum            | ug/g  | <0.1           |
| Nickel                | ug/g  | 13             |
| Phosphorus            | ug/g  | 570            |
| Potassium             | ug/g  | 6580           |
| Selenium              | ug/g  | 0.2            |
| Silver                | ug/g  | <0.1           |
| Sodium                | ug/g  | 400            |
| Strontium             | ug/g  | 150            |
| Thallium              | ug/g  | <0.2           |
| Tin                   | ug/g  | <0.1           |
| Titanium              | ug/g  | 710            |
| Uranium               | ug/g  | 7.8            |
| Vanadium              | ug/g  | 45             |
| Zinc                  | ug/g  | 34             |
| Sulfate, acid soluble | ug/g  | 310            |
| Time charge           | --    | see attachment |

## RADIO CHEMISTRY

|              |      |      |
|--------------|------|------|
| Lead-210     | Bq/g | 0.03 |
| Polonium-210 | Bq/g | 0.04 |
| Radium-226   | Bq/g | 0.06 |
| Thorium-230  | Bq/g | 0.05 |

## ORGANIC CHEMISTRY

|                      |      |       |
|----------------------|------|-------|
| Acenaphthene         | ug/g | <0.01 |
| Acenaphthylene       | ug/g | <0.01 |
| Anthracene           | ug/g | <0.01 |
| Benzo(a)anthracene   | ug/g | <0.02 |
| Benzo(a)pyrene       | ug/g | <0.1  |
| Benzo(b)fluoranthene | ug/g | <0.1  |
| Benzo(e)pyrene       | ug/g | <0.1  |

**SRC ANALYTICAL**

Jacques Whitford Axys

Nov-26-2008

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|        |                                         |
|--------|-----------------------------------------|
| SAMPLE | CLIENT DESCRIPTION                      |
| 39660  | 9/21/2008 12:00:00 PM SITE 4 *SEDIMENT* |

---

| ANALYTE                 | UNITS | 39660 |
|-------------------------|-------|-------|
| Benzo(g,h,i)perylene    | ug/g  | <0.1  |
| Benzo(k)fluoranthene    | ug/g  | <0.1  |
| Chrysene                | ug/g  | <0.02 |
| Dibenzo(a,h)anthracene  | ug/g  | <0.1  |
| Fluoranthene            | ug/g  | <0.01 |
| Fluorene                | ug/g  | <0.01 |
| Indeno(1,2,3-c,d)pyrene | ug/g  | <0.1  |
| Naphthalene             | ug/g  | <0.01 |
| Perylene                | ug/g  | <0.1  |
| Phenanthrene            | ug/g  | <0.01 |
| Pyrene                  | ug/g  | 0.01  |

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"<": not detected at level stated above

Results are reported on a dry basis.

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample Details/Parameters                                                  |                            | Result | Qualifier* | D.L. | Units | Extracted | Analyzed  | By  | Batch   |
|----------------------------------------------------------------------------|----------------------------|--------|------------|------|-------|-----------|-----------|-----|---------|
| L692144-1                                                                  | 39657                      |        |            |      |       |           |           |     |         |
| Sampled By:                                                                | NOT PROVIDED on 06-OCT-08  |        |            |      |       |           |           |     |         |
| Matrix:                                                                    | SOIL                       |        |            |      |       |           |           |     |         |
| <b>Particle size - Sieve and Pipette</b>                                   |                            |        |            |      |       |           |           |     |         |
|                                                                            | % Gravel (>2mm)            | 12     |            | 1    | %     | 08-OCT-08 | 08-OCT-08 | HSL | R738916 |
|                                                                            | % Sand (2.0mm - 0.063mm)   | 87     |            | 1    | %     | 08-OCT-08 | 08-OCT-08 | HSL | R738916 |
|                                                                            | % Silt (0.063mm - 4um)     | 1      |            | 1    | %     | 08-OCT-08 | 08-OCT-08 | HSL | R738916 |
|                                                                            | % Clay (<4um)              | 1      |            | 1    | %     | 08-OCT-08 | 08-OCT-08 | HSL | R738916 |
|                                                                            | Total Carbon by Combustion | <0.1   |            | 0.1  | %     | 10-OCT-08 | 10-OCT-08 | DQH | R740266 |
| L692144-2                                                                  | 39658                      |        |            |      |       |           |           |     |         |
| Sampled By:                                                                | NOT PROVIDED on 06-OCT-08  |        |            |      |       |           |           |     |         |
| Matrix:                                                                    | SOIL                       |        |            |      |       |           |           |     |         |
| <b>Particle size - Sieve and Pipette</b>                                   |                            |        |            |      |       |           |           |     |         |
|                                                                            | % Gravel (>2mm)            | <1     |            | 1    | %     | 08-OCT-08 | 08-OCT-08 | HSL | R738916 |
|                                                                            | % Sand (2.0mm - 0.063mm)   | 80     |            | 1    | %     | 08-OCT-08 | 08-OCT-08 | HSL | R738916 |
|                                                                            | % Silt (0.063mm - 4um)     | 17     |            | 1    | %     | 08-OCT-08 | 08-OCT-08 | HSL | R738916 |
|                                                                            | % Clay (<4um)              | 3      |            | 1    | %     | 08-OCT-08 | 08-OCT-08 | HSL | R738916 |
|                                                                            | Total Carbon by Combustion | 0.3    |            | 0.1  | %     | 10-OCT-08 | 10-OCT-08 | DQH | R740266 |
| L692144-3                                                                  | 39659                      |        |            |      |       |           |           |     |         |
| Sampled By:                                                                | NOT PROVIDED on 06-OCT-08  |        |            |      |       |           |           |     |         |
| Matrix:                                                                    | SOIL                       |        |            |      |       |           |           |     |         |
| <b>Particle size - Sieve and Pipette</b>                                   |                            |        |            |      |       |           |           |     |         |
|                                                                            | % Gravel (>2mm)            | <1     |            | 1    | %     | 08-OCT-08 | 08-OCT-08 | HSL | R738916 |
|                                                                            | % Sand (2.0mm - 0.063mm)   | 99     |            | 1    | %     | 08-OCT-08 | 08-OCT-08 | HSL | R738916 |
|                                                                            | % Silt (0.063mm - 4um)     | 1      |            | 1    | %     | 08-OCT-08 | 08-OCT-08 | HSL | R738916 |
|                                                                            | % Clay (<4um)              | <1     |            | 1    | %     | 08-OCT-08 | 08-OCT-08 | HSL | R738916 |
|                                                                            | Total Carbon by Combustion | <0.1   |            | 0.1  | %     | 10-OCT-08 | 10-OCT-08 | DQH | R740266 |
| L692144-4                                                                  | 39660                      |        |            |      |       |           |           |     |         |
| Sampled By:                                                                | NOT PROVIDED on 06-OCT-08  |        |            |      |       |           |           |     |         |
| Matrix:                                                                    | SOIL                       |        |            |      |       |           |           |     |         |
| <b>Particle size - Sieve and Pipette</b>                                   |                            |        |            |      |       |           |           |     |         |
|                                                                            | % Gravel (>2mm)            | 18     |            | 1    | %     | 08-OCT-08 | 08-OCT-08 | HSL | R738916 |
|                                                                            | % Sand (2.0mm - 0.063mm)   | 57     |            | 1    | %     | 08-OCT-08 | 08-OCT-08 | HSL | R738916 |
|                                                                            | % Silt (0.063mm - 4um)     | 17     |            | 1    | %     | 08-OCT-08 | 08-OCT-08 | HSL | R738916 |
|                                                                            | % Clay (<4um)              | 7      |            | 1    | %     | 08-OCT-08 | 08-OCT-08 | HSL | R738916 |
|                                                                            | Total Carbon by Combustion | 0.3    |            | 0.1  | %     | 10-OCT-08 | 10-OCT-08 | DQH | R740266 |
| * Refer to Referenced Information for Qualifiers (if any) and Methodology. |                            |        |            |      |       |           |           |     |         |

## Reference Information

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description                  | Preparation Method Reference(Based On) | Analytical Method Reference(Based On) |
|---------------|--------|-----------------------------------|----------------------------------------|---------------------------------------|
| C-TOT-LECO-SK | Soil   | Total Carbon by combustion method |                                        | SSSA (1996) - Combustion Instrument   |

The sample is introduced into a quartz tube where it undergoes combustion at 900 °C in the presence of oxygen. Combustion gases are first carried through a catalyst bed in the bottom of the combustion tube, where oxidation is completed and then carried through a reducing agent (copper), where the nitrogen oxides are reduced to elemental nitrogen. This mixture of N<sub>2</sub>, CO<sub>2</sub>, and H<sub>2</sub>O is then passed through an absorber column containing magnesium perchlorate to remove water. N<sub>2</sub> and CO<sub>2</sub> gases are then separated in a gas chromatographic column and detected by thermal conductivity.

#### Reference:

Nelson, D.W. and Sommers, L.E. 1996. Total Carbon, organic carbon and organic matter. P. 961-1010 In: J.M. Bartels et al. (ed.) Methods of soil analysis: Part 3 Chemical methods. (3rd ed.) ASA and SSSA, Madison, WI. Book series no. 5

|                     |      |                                   |                                 |
|---------------------|------|-----------------------------------|---------------------------------|
| PSA-PIPET+GRAVEL-SK | Soil | Particle size - Sieve and Pipette | FORESTRY CANADA (1991) P. 46-48 |
|---------------------|------|-----------------------------------|---------------------------------|

MOD

Particle size analysis involves the measurement of the proportions of the various primary soil particle sizes (ie. clay < 0.004 mm, silt 0.004-0.063 mm, sand 0.063-2.0 mm and gravel > 2.0 mm). In this method, the gravel and sand portions are determined by sieving, while the clay portion is determined by sedimentation using Stokes Law, which relates the radius of the particles to the velocity of the sedimentation in water. Silt is calculated as 100% - ( sand% + clay%)

Pretreatment of the soil with Calgon (sodium hexametaphosphate) is used to ensure the complete dispersion of the primary soil particles. Additional pretreatment may be necessary to remove cementing materials such as CaCO<sub>3</sub> and organic matter.

#### Reference

Y.P. Kalra, and D.G. Maynard, 1991. Methods Manual For Forest Soil and Plant Analysis, Northwest Region. Forestry Canada (modified sand, silt and clay size ranges)

\*\* Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

#### Chain of Custody numbers:

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

| Laboratory Definition Code | Laboratory Location                                          | Laboratory Definition Code | Laboratory Location |
|----------------------------|--------------------------------------------------------------|----------------------------|---------------------|
| SK                         | ALS LABORATORY GROUP -<br>SASKATOON, SASKATCHEWAN,<br>CANADA |                            |                     |

#### GLOSSARY OF REPORT TERMS

**Surr** - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency. The Laboratory control limits are determined under column heading D.L.

mg/kg (units) - unit of concentration based on mass, parts per million.

mg/L (units) - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

*Test results reported relate only to the samples as received by the laboratory.*

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

**REVISED**

SRC Group # 2008-8458

**SRC ANALYTICAL**

Oct 17, 2008

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Jacques Whitford Axys  
4370 Dominion St.  
Burnaby, BC V5G 4L7  
Attn: Janine Beckett

Page 1 of 2

Sample # **39791**  
Date Sampled: **Sep 21, 2008**  
Sample Matrix: **SEDIMENT**  
Description: **SITE 5**

Client PO #: **1038926**  
Date Received: **Sep 26, 2008**

| Analyte                     | Units    | Result          | DL   | Date Entered |
|-----------------------------|----------|-----------------|------|--------------|
| <b>Inorganic Chemistry</b>  |          |                 |      |              |
| Chloride, water soluble     | ug/g     | 200             | 100  | Oct 07, 2008 |
| pH                          | pH units | 5.81 1:1 slurry | 0.07 | Oct 03, 2008 |
| Specific conductivity       | uS/cm    | 130 1:1 slurry  | 1    | Oct 03, 2008 |
| Ammonia as nitrogen         | ug/g     | 2               | 1    | Oct 07, 2008 |
| Nitrite+Nitrate nitrogen    | ug/g     | 5               | 1    | Oct 07, 2008 |
| Total Kjeldahl nitrogen     | ug/g     | 600             | 5    | Oct 07, 2008 |
| Aluminum                    | ug/g     | 28400           | 20   | Oct 06, 2008 |
| Antimony                    | ug/g     | <0.2            | 0.2  | Oct 06, 2008 |
| Arsenic                     | ug/g     | 8.9             | 0.1  | Oct 06, 2008 |
| Barium                      | ug/g     | 160             | 0.5  | Oct 06, 2008 |
| Beryllium                   | ug/g     | 1.1             | 0.1  | Oct 06, 2008 |
| Boron                       | ug/g     | 150             | 1    | Oct 06, 2008 |
| Cadmium                     | ug/g     | <0.1            | 0.1  | Oct 06, 2008 |
| Calcium                     | ug/g     | 4200            | 1    | Oct 17, 2008 |
| Chromium                    | ug/g     | 19              | 0.5  | Oct 06, 2008 |
| Cobalt                      | ug/g     | 7.5             | 0.2  | Oct 06, 2008 |
| Copper                      | ug/g     | 7.8             | 0.5  | Oct 06, 2008 |
| Iron                        | ug/g     | 18200           | 20   | Oct 06, 2008 |
| Lead                        | ug/g     | 12              | 0.1  | Oct 06, 2008 |
| Magnesium                   | ug/g     | 6760            | 1    | Oct 17, 2008 |
| Manganese                   | ug/g     | 490             | 0.5  | Oct 06, 2008 |
| Molybdenum                  | ug/g     | 1.2             | 0.1  | Oct 06, 2008 |
| Nickel                      | ug/g     | 16              | 0.1  | Oct 06, 2008 |
| Phosphorus                  | ug/g     | 830             | 1    | Oct 17, 2008 |
| Potassium                   | ug/g     | 8660            | 1    | Oct 17, 2008 |
| Selenium                    | ug/g     | 0.5             | 0.1  | Oct 06, 2008 |
| Silver                      | ug/g     | 0.2             | 0.1  | Oct 06, 2008 |
| Sodium                      | ug/g     | 490             | 1    | Oct 17, 2008 |
| Strontium                   | ug/g     | 130             | 0.5  | Oct 06, 2008 |
| Thallium                    | ug/g     | 0.2             | 0.2  | Oct 06, 2008 |
| Tin                         | ug/g     | 0.4             | 0.1  | Oct 06, 2008 |
| Titanium                    | ug/g     | 1200            | 20   | Oct 06, 2008 |
| Uranium                     | ug/g     | 2.5             | 0.1  | Oct 06, 2008 |
| Vanadium                    | ug/g     | 53              | 0.1  | Oct 06, 2008 |
| Zinc                        | ug/g     | 46              | 0.5  | Oct 06, 2008 |
| Sulfate, acid soluble       | ug/g     | 390             | 10   | Oct 07, 2008 |
| Time charge - Subcontracted | --       | see attachment  | 0    | Oct 09, 2008 |

**REVISED**

SRC Group # 2008-8458

**SRC ANALYTICAL**

Oct 17, 2008

Jacques Whitford Axys

Page 2 of 2

Sample # **39791 (Continued)**  
Date Sampled: **Sep 21, 2008**  
Sample Matrix: **SEDIMENT**  
Description: **SITE 5**

Client PO #: **1038926**  
Date Received: **Sep 26, 2008**

| Analyte                  | Units | Result | DL    | Date Entered |
|--------------------------|-------|--------|-------|--------------|
| <b>Radio Chemistry</b>   |       |        |       |              |
| Lead-210                 | Bq/g  | 0.09   | 0.02  | Oct 08, 2008 |
| Polonium-210             | Bq/g  | 0.08   | 0.005 | Oct 07, 2008 |
| Radium-226               | Bq/g  | 0.04   | 0.01  | Oct 07, 2008 |
| Thorium-230              | Bq/g  | 0.08   | 0.02  | Oct 07, 2008 |
| <b>Organic Chemistry</b> |       |        |       |              |
| Acenaphthene             | ug/g  | <0.01  | 0.01  | Oct 02, 2008 |
| Acenaphthylene           | ug/g  | <0.01  | 0.01  | Oct 02, 2008 |
| Anthracene               | ug/g  | <0.01  | 0.01  | Oct 02, 2008 |
| Benzo(a)anthracene       | ug/g  | <0.02  | 0.02  | Oct 02, 2008 |
| Benzo(a)pyrene           | ug/g  | <0.1   | 0.1   | Oct 02, 2008 |
| Benzo(b)fluoranthene     | ug/g  | <0.1   | 0.1   | Oct 02, 2008 |
| Benzo(e)pyrene           | ug/g  | <0.1   | 0.1   | Oct 02, 2008 |
| Benzo(g,h,i)perylene     | ug/g  | <0.1   | 0.1   | Oct 02, 2008 |
| Benzo(k)fluoranthene     | ug/g  | <0.1   | 0.1   | Oct 02, 2008 |
| Chrysene                 | ug/g  | <0.02  | 0.02  | Oct 02, 2008 |
| Dibenzo(a,h)anthracene   | ug/g  | <0.1   | 0.1   | Oct 02, 2008 |
| Fluoranthene             | ug/g  | <0.01  | 0.01  | Oct 02, 2008 |
| Fluorene                 | ug/g  | <0.01  | 0.01  | Oct 02, 2008 |
| Indeno(1,2,3-c,d)pyrene  | ug/g  | <0.1   | 0.1   | Oct 02, 2008 |
| Naphthalene              | ug/g  | <0.01  | 0.01  | Oct 02, 2008 |
| Perylene                 | ug/g  | <0.1   | 0.1   | Oct 02, 2008 |
| Phenanthrene             | ug/g  | <0.01  | 0.01  | Oct 02, 2008 |
| Pyrene                   | ug/g  | <0.01  | 0.01  | Oct 02, 2008 |

"<": not detected at level stated above.

Results are reported on a dry basis.

Note revised results for Na, Mg, K, Ca, and P.



**SRC ANALYTICAL**

Sep 21, 2009

422 Downey Road  
 Saskatoon, Saskatchewan, Canada  
 S7N 4N1  
 (306) 933-6932 or 1-800-240-8808  
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Areva Resources Canada Inc.  
 P.O. Box 9204  
 817-825 45th Street West  
 Saskatoon, Saskatchewan S7K 3X5  
 Attn: Nicola Banton

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Sample # **37872**  
 Date Sampled: **Aug 26, 2009 13:00**  
 Sample Matrix: **SEDIMENT**  
 Description: **SITE 1**

Client PO #: **7500000591**  
 Date Received: **Aug 28, 2009**

| Analyte                    | Units | Result | DL  |
|----------------------------|-------|--------|-----|
| <b>Inorganic Chemistry</b> |       |        |     |
| Organic carbon             | %     | 0.30   | 0.1 |
| Aluminum                   | ug/g  | 18000  | 20  |
| Antimony                   | ug/g  | <0.2   | 0.2 |
| Arsenic                    | ug/g  | 9.1    | 0.1 |
| Barium                     | ug/g  | 150    | 0.5 |
| Beryllium                  | ug/g  | 0.6    | 0.1 |
| Boron                      | ug/g  | <1     | 1   |
| Cadmium                    | ug/g  | <0.1   | 0.1 |
| Chromium                   | ug/g  | 19     | 0.5 |
| Cobalt                     | ug/g  | 5.9    | 0.2 |
| Copper                     | ug/g  | 6.9    | 0.5 |
| Iron                       | ug/g  | 18100  | 20  |
| Lead                       | ug/g  | 7.3    | 0.1 |
| Manganese                  | ug/g  | 1720   | 0.5 |
| Molybdenum                 | ug/g  | 1.3    | 0.1 |
| Nickel                     | ug/g  | 13     | 0.1 |
| Selenium                   | ug/g  | 0.2    | 0.1 |
| Silver                     | ug/g  | <0.1   | 0.1 |
| Strontium                  | ug/g  | 83     | 0.5 |
| Thallium                   | ug/g  | <0.2   | 0.2 |
| Tin                        | ug/g  | 0.2    | 0.1 |
| Titanium                   | ug/g  | 750    | 0.5 |
| Uranium                    | ug/g  | 1.9    | 0.1 |
| Vanadium                   | ug/g  | 30     | 0.1 |
| Zinc                       | ug/g  | 30     | 0.5 |
| Gravel                     | wt %  | 2.0    | 1   |
| Coarse Sand                | wt %  | 8.0    | 1   |
| Fine Sand                  | wt %  | 47.0   | 1   |
| Silt                       | wt %  | 36.0   | 1   |
| Clay                       | wt %  | 7.0    | 1   |

"<": not detected at level stated above.

Results are reported on a dry basis.

**SRC ANALYTICAL**

Sep 21, 2009

Areva Resources Canada Inc.

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Sample # **37873**  
 Date Sampled: **Aug 26, 2009 10:45**  
 Sample Matrix: **SEDIMENT**  
 Description: **SITE 2**

Client PO #: **7500000591**  
 Date Received: **Aug 28, 2009**

| Analyte                    | Units | Result | DL  |
|----------------------------|-------|--------|-----|
| <b>Inorganic Chemistry</b> |       |        |     |
| Organic carbon             | %     | <0.10  | 0.1 |
| Aluminum                   | ug/g  | 10600  | 20  |
| Antimony                   | ug/g  | <0.2   | 0.2 |
| Arsenic                    | ug/g  | 6.1    | 0.1 |
| Barium                     | ug/g  | 180    | 0.5 |
| Beryllium                  | ug/g  | 0.4    | 0.1 |
| Boron                      | ug/g  | <1     | 1   |
| Cadmium                    | ug/g  | <0.1   | 0.1 |
| Chromium                   | ug/g  | 11     | 0.5 |
| Cobalt                     | ug/g  | 3.3    | 0.2 |
| Copper                     | ug/g  | 3.6    | 0.5 |
| Iron                       | ug/g  | 10600  | 20  |
| Lead                       | ug/g  | 3.1    | 0.1 |
| Manganese                  | ug/g  | 130    | 0.5 |
| Molybdenum                 | ug/g  | 0.3    | 0.1 |
| Nickel                     | ug/g  | 9.8    | 0.1 |
| Selenium                   | ug/g  | <0.1   | 0.1 |
| Silver                     | ug/g  | <0.1   | 0.1 |
| Strontium                  | ug/g  | 48     | 0.5 |
| Thallium                   | ug/g  | <0.2   | 0.2 |
| Tin                        | ug/g  | <0.1   | 0.1 |
| Titanium                   | ug/g  | 330    | 0.5 |
| Uranium                    | ug/g  | 0.8    | 0.1 |
| Vanadium                   | ug/g  | 16     | 0.1 |
| Zinc                       | ug/g  | 16     | 0.5 |
| Gravel                     | wt %  | 5.0    | 1   |
| Coarse Sand                | wt %  | 65.0   | 1   |
| Fine Sand                  | wt %  | 27.0   | 1   |
| Silt                       | wt %  | 2.0    | 1   |
| Clay                       | wt %  | 1.0    | 1   |

"<": not detected at level stated above.

Results are reported on a dry basis.