CONTAMINATED SOIL MANAGEMENT
LONG TERM MONITORING PLAN

Prepared for:

IQALUIT INTERNATIONAL AIRPORT
DESIGN AND BUILD JOINT VENTURE

October 2014

Rev 1.0

O/Ref.: QE14-214-11

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Prepared and reviewed by:

Greg Johnson, M.Sc.A, P.Eng.
Project Director – Northern Projects

Approved by:

Agnès Renoux, Ph. D.
Directrice – Analyse de risques

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1. CONTAMINATED SOIL CONTAINMENT CELL

1.1 Years 1 to 5

a. In the first year 5 separate samples will need to be collected at the beginning of the summer to establish a baseline for the monitoring wells. One sample will be collected at the end of the summer.

b. Each of the monitoring wells will be sampled at the start and end of each subsequent summer season

c. The monitoring wells will be sampled for the following parameters (as these are the only parameters that are of concern in the contaminated soils stored in the pad)

   i. Oil and Grease
   ii. PHC Fractions F1-F4 & BTEX
   iii. Arsenic
   iv. Total Chromium

d. A statistical analysis will be performed to see how the results compare to the results from previous sampling periods. After 5 years, should the statistical analysis show a significant difference in the results and an upward trend in the concentrations of contaminants of concern, then additional investigation will be required to determine the source of the problem and the corrective actions required.

e. Should a significant increase or decrease in the concentrations of the contaminants of concern be found in the groundwater from one sampling period to the next (a factor of 10 or more), then the frequency of sampling will need to be increased to once per week, to have enough data points to be able to perform a statistical analysis to determine what the actual long-term trend of the concentration of contaminants of concern are (minimum of 10 data points).

f. Should additional soils be added to the Contaminated Soil Storage cell that have new contaminants of concern, then the monitoring program will be restarted at year 1 and these parameters will be added to the monitoring program.

g. The integrity of the covering membrane and the berms will also be inspected during the groundwater sampling period to ensure that they are still functioning properly. Any defects will be repaired.

1.2 Years 7, 9, 12 and 15

a. Each of the monitoring wells will be sampled in mid-July

b. The monitoring wells will be sampled for the following parameters (as these are the only parameters that are of concern in the contaminated soils stored in the pad)
    i. Oil and Grease
    ii. PHC Fractions F1-F4 & BTEX
    iii. Arsenic
    iv. Total Chromium
c. The results will be compared to the results from previous years to see if they are statistically different from the average of the previous years.
    i. If not, then no further actions are required
    ii. If so, then additional investigation will be required to determine the source and the corrective actions required
        1. The long-term sampling plan would be restarted at year 1 should this be the case
d. The integrity of the covering membrane and the berms will also be inspected during the groundwater sampling period to ensure that they are still functioning properly. Any defects will be repaired.

1.3 Years 20, 25 and 30

a. Each of the monitoring wells will be sampled in mid-July
b. The monitoring wells will be sampled for the following parameters (as these are the only parameters that are of concern in the contaminated soils stored in the pad)
    i. Oil and Grease
    ii. PHC Fractions F1-F4 & BTEX
    iii. Arsenic
    iv. Total Chromium
c. The results will be compared to the results from previous years to see if they are statistically different from the average of the previous years.
    i. If not, then no further actions are required
    ii. If so, then additional investigation will be required to determine the source and the corrective actions required
        1. The long-term sampling plan would be restarted at year 1 should this be the case
d. The integrity of the covering membrane and the berms will also be inspected during the groundwater sampling period to ensure that they are still functioning properly. Any defects will be repaired.

2. RISK BASED MANAGEMENT OF SOIL

2.1 Years 1 to 5

a. Each of the monitoring wells will be sampled at the start and end of each summer season

b. The monitoring wells will be sampled for the following parameters (as these are the only parameters that are of concern in the contaminated soils stored in the pad)

   i. Oil and Grease
   ii. PHC Fractions F1-F4 & BTEX
   iii. Arsenic
   iv. Total Chromium

c. A statistical analysis will be performed to see how the results compare to the results from previous sampling periods. After 5 years, should the statistical analysis show a significant difference in the results and an upward trend in the concentrations of contaminants of concern, then additional investigation will be required to determine the source of the problem and the corrective actions required.

d. Should a significant increase or decrease in the concentrations of the contaminants of concern be found in the groundwater from one sampling period to the next (a factor of 10 or more), then the frequency of sampling will need to be increased to once per week, to have enough data points to be able to perform a statistical analysis to determine what the actual long-term trend of the concentration of contaminants of concern are (minimum of 10 data points).

e. Should additional soils be added to the Contaminated Soil Storage Area that have new contaminants of concern, prior to them being capped with clean fill and the asphalt for the new apron, these parameters will be added to the monitoring program.

f. No contaminated soils will be added to the Contaminated Soil Storage Area once they have been covered with clean soils.

g. The integrity of covering asphalt and granular material slopes will be inspected during the groundwater sampling period to ensure there is no sign of erosion. Any defect will be repaired.

2.2 Years 7, 9, 12 and 15

a. Each of the monitoring wells will be sampled in mid-July

b. The monitoring wells will be sampled for the following parameters (as these are the only parameters that are of concern in the contaminated soils stored in the pad)

i. Oil and Grease
ii. PHC Fractions F1-F4 & BTEX
iii. Arsenic
iv. Total Chromium

c. The results will be compared to the results from previous years to see if they are statistically different from the average of the previous years.
    i. If not, then no further actions are required
    ii. If so, then additional investigation will be required to determine the source and the corrective actions required
        1. The long-term sampling plan would be restarted at year 1 should this be the case
d. The integrity of covering asphalt and granular material slopes will be inspected during the groundwater sampling period to ensure there is no sign of erosion. Any defect will be repaired.

2.3 Years 20, 25 and 30

a. Each of the monitoring wells will be sampled in mid-July
b. The monitoring wells will be sampled for the following parameters (as these are the only parameters that are of concern in the contaminated soils stored in the pad)
    i. Oil and Grease
    ii. PHC Fractions F1-F4 & BTEX
    iii. Arsenic
    iv. Total Chromium
c. The results will be compared to the results from previous years to see if they are statistically different from the average of the previous years.
    i. If not, then no further actions are required
    ii. If so, then additional investigation will be required to determine the source and the corrective actions required
        1. The long-term sampling plan would be restarted at year 1 should this be the case
d. The integrity of covering asphalt and granular material slopes will be inspected during the groundwater sampling period to ensure there is no sign of erosion. Any defect will be repaired.