Note 5.23 for Carcinogenic PAHs (as B(a)P TPE):

Guideline for B(A)P Total Potency Equivalent is 0.6 mg/kg based on an incremental lifetime cancer risk (ILCR) of 1 in 1,000,000 (10-6).
Guideline for B(A)P Total Potency Equivalent is 5.3 mg/kg based on an incremental lifetime cancer risk (ILCR) of 1 in 100,000 (10-5).
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects.
For soil contaminated with coal tar or creosote mixtures, the calculated Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) concentration for soil samples should be multiplied by a safety factor of 3 prior to comparison with the guideline to account for carcinogenic potential of alkylated and other PAHs present for which a Potency Equivalence Factor (PEF) does not currently exist, but which are likely to contribute to mixture carcinogenic potential. / The most stringent guideline was used in this report.

Note 5.24 for Phenanthrene:

Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected.
Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects.
The environmental Soil Quality Guideline for Phenanthrene is 0.046 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).

Note 5.25 for Pyrene:

Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected.
Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects.
The environmental Soil Quality Guideline for Pyrene is 100 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).

Note 5.26 for Zinc:

Reference: Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health; Factsheet for Zinc, 2018.
Data are sufficient and adequate to calculate guidelines for human health and environmental health. Therefore, the soil quality guideline is the lower of the two and supersedes the 1999 soil quality guideline and the 1991 interim remediation criteria for soil.

6. Notes for CCME. Canadian Soil Quality Guidelines; and Canada-Wide Standards for Petroleum Hydrocarbons in Soil - for Residential/ parkland Land Use and Coarse-grained Soil. (CCME SO RL/PL CS)

General Notes:

There are different guidelines based on site-specific factors for some analytes. The most stringent guidelines were used.

Note 6.1 for Benzene:

The guideline for benzene is 0.030 mg/kg for the following:
• Surface soil (<=1.5 m) with coarse soil texture, and based on a lifetime incremental cancer risk of 1 in 100,000 (10-5).
• Subsoil (>1.5 m) with coarse soil texture, and based on a lifetime incremental cancer risk of 1 in 100,000 (10-5).
The guideline for benzene is 0.0095 mg/kg for the following:
• Surface soil (<=1.5 m) with coarse soil texture, and based on a lifetime incremental cancer risk of 1 in 1,000,000 (10-6).
The guideline for benzene is 0.011 mg/kg for the following:
• Subsoil (>1.5 m) with coarse soil texture, and based on a lifetime incremental cancer risk of 1 in 1,000,000 (10-6). / The most stringent guideline was used in this report.

Note 6.2 for Ethylbenzene:

The guideline for ethylbenzene is 0.082 mg/kg for the following:
• Surface soil with coarse soil texture
• Subsoil with coarse soil texture

Note 6.3 for F1 (CCME): (C6-C10) (less BTEX):

Standard assumes contamination near residence, and is for coarse, surface soil. The standard for F1 excludes benzene, toluene, ethylbenzene and xylenes.
Reference: Canadian Council of Ministers of the Environment, Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil, 2008. Table 1 - Summary of Tier 1 Levels for surface soil.

Note 6.4 for F2 (C10-C16):

This Tier 1 Level is for coarse, surface soil.
"Coarse" means coarse-textured soil having a median grain size of >75 µm as defined by the American Society for Testing and Materials.
Reference: Canadian Council of Ministers of the Environment, Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil, 2008. Table 1 - Summary of Tier 1 Levels for surface soil.

Note 6.5 for F3 (C16-C34):
This Tier 1 Level is for coarse, surface soil. "Coarse" means coarse-textured soil having a median grain size of >75 µm as defined by the American Society for Testing and Materials. Reference: Canadian Council of Ministers of the Environment, Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil, 2008. Table 1 - Summary of Tier 1 Levels for surface soil.
Note 6.6 for F4 (CCME): (>C34-C50):
This Tier 1 Level is for coarse, surface soil. "Coarse" means coarse-textured soil having a median grain size of >75 µm as defined by the American Society for Testing and Materials. Reference: Canadian Council of Ministers of the Environment, Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil, 2008. Table 1 - Summary of Tier 1 Levels for surface soil.
Note 6.7 for Toluene:
The guideline for toluene is 0.37 mg/kg for the following: • Surface soil with coarse soil texture • Subsoil with coarse soil texture
Note 6.8 for Xylene:
The guideline for xylenes is 11 mg/kg for the following: • Surface soil with coarse soil texture • Subsoil with coarse soil texture
Note 6.9 for Acenaphthene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Acenaphthene is 0.28 mg/kg based on non-carcinogenic effects (from Table 2 of CCME PAHs Factsheet 2010).
Note 6.10 for Acenaphthylene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Acenaphthylene is 320 mg/kg based on non-carcinogenic effects (from Table 2 of CCME PAHs Factsheet 2010).
Note 6.11 for Anthracene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Anthracene is 2.5 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).
Note 6.12 for Benz[a]anthracene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Benzo[a]anthracene is 1 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).
Note 6.13 for Benzo[a]pyrene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Benzo[a]pyrene is 20 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).

Note 6.14 for Benzo[g,h,i]perylene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. An environmental Soil Quality Guideline for Benzo[g,h,i]perylene based on non-carcinogenic effects is not available in Table 1 and 2 of CCME PAHs Factsheet 2010.
Note 6.15 for Benzo[k]fluoranthene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Benzo[k]fluoranthene is 1 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).
Note 6.16 for Chrysene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. An environmental Soil Quality Guideline for Chrysene based on non-carcinogenic effects is 6.2 mg/kg based on Table 2 of CCME PAHs Factsheet 2010.
Note 6.17 for Dibenz[a,h]anthracene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Dibenz[a,h]anthracene is 1 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).
Note 6.18 for Fluoranthene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Fluoranthene is 50 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).
Note 6.19 for Fluorene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Fluorene is 0.25 mg/kg based on non-carcinogenic effects (from Table 2 of CCME PAHs Factsheet 2010).
Note 6.20 for IACR (CCME):
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects.
Note 6.21 for Indeno[1,2,3-cd]pyrene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Indeno[1,2,3-cd]pyrene is 1 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).

Note 6.22 for Naphthalene:

Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected.
Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects.
The environmental Soil Quality Guideline for Naphthalene is 0.013 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).

Note 6.23 for Carcinogenic PAHs (as B(a)P TPE):

Guideline for B(A)P Total Potency Equivalent is 0.6 mg/kg based on an incremental lifetime cancer risk (ILCR) of 1 in 1,000,000 (10-6).
Guideline for B(A)P Total Potency Equivalent is 5.3 mg/kg based on an incremental lifetime cancer risk (ILCR) of 1 in 100,000 (10-5).
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects.
For soil contaminated with coal tar or creosote mixtures, the calculated Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) concentration for soil samples should be multiplied by a safety factor of 3 prior to comparison with the guideline to account for carcinogenic potential of alkylated and other PAHs present for which a Potency Equivalence Factor (PEF) does not currently exist, but which are likely to contribute to mixture carcinogenic potential. / The most stringent guideline was used in this report.

Note 6.24 for Phenanthrene:

Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected.
Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects.
The environmental Soil Quality Guideline for Phenanthrene is 0.046 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).

Note 6.25 for Pyrene:

Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected.
Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects.
The environmental Soil Quality Guideline for Pyrene is 10 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).

Note 6.26 for Zinc:

Reference: Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health; Factsheet for Zinc, 2018.
Data are sufficient and adequate to calculate guidelines for human health and environmental health. Therefore, the soil quality guideline is the lower of the two and supersedes the 1999 soil quality guideline and the 1991 interim remediation criteria for soil.

7. Notes for CCME. Canadian Soil Quality Guidelines; and Canada-Wide Standards for Petroleum Hydrocarbons in Soil - for Residential/ parkland Land Use and Fine-grained Soil. (CCME SO RL/PL FS)

General Notes:

There are different guidelines based on site-specific factors for some analytes. The most stringent guidelines were used.

Note 7.1 for Benzene:

The guideline for benzene is 0.0068 mg/kg for the following:
- Surface soil (<=1.5 m) with fine soil texture, and based on a lifetime incremental cancer risk of 1 in 100,000 (10-5).
- Subsoil (>1.5 m) with fine soil texture, and based on a lifetime incremental cancer risk of 1 in 100,000 (10-5).
- Surface soil (<=1.5 m) with fine soil texture, and based on a lifetime incremental cancer risk of 1 in 1,000,000 (10-6).
- Subsoil with (> 1.5 m) fine soil texture, and based on a lifetime incremental cancer risk of 1 in 1,000,000 (10-6).

Note 7.2 for Ethylbenzene:

The guideline for ethylbenzene is 0.018 mg/kg for the following:
- Surface soil with fine soil texture
- Subsoil with fine soil texture

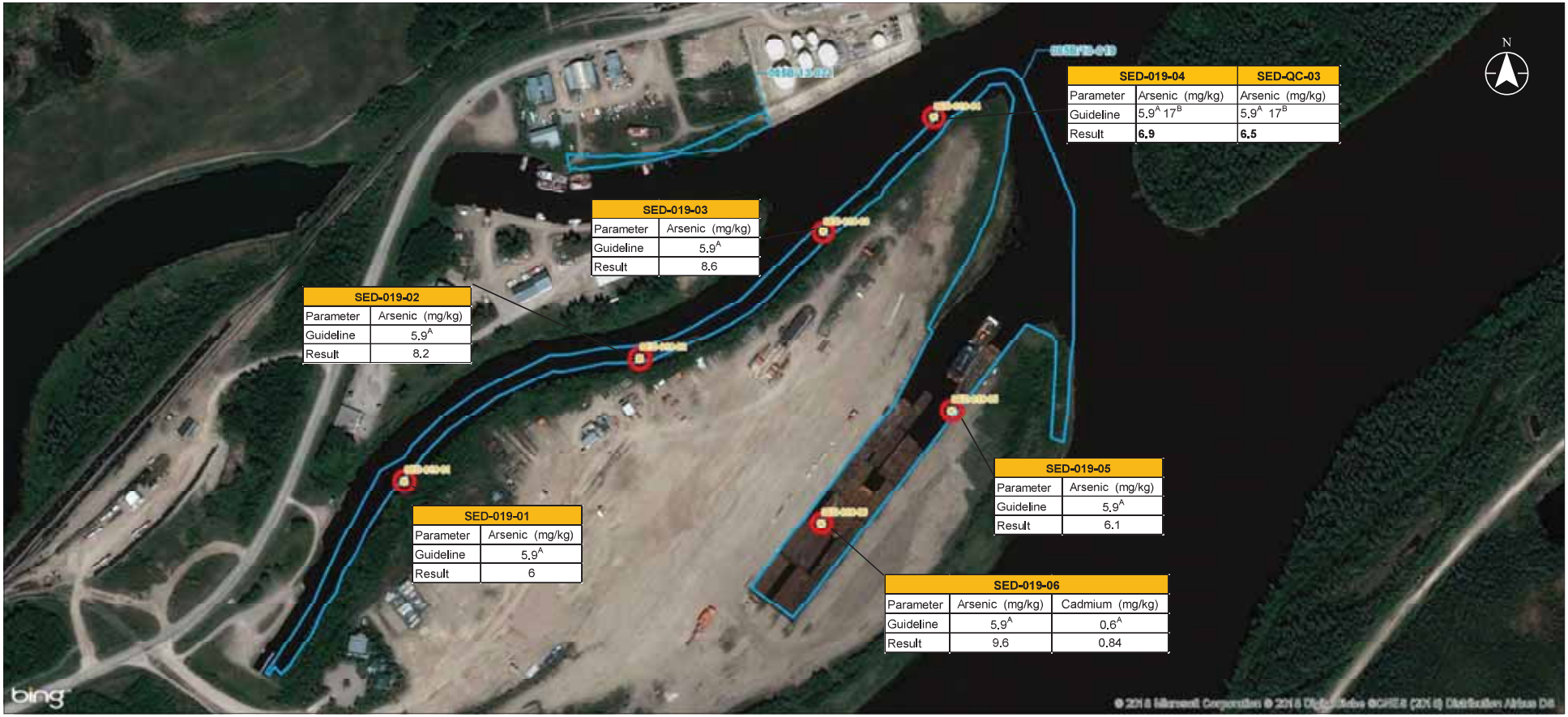
Note 7.3 for F1 (CCME): (C6-C10) (less BTEX):

This Tier 1 Level is for fine, surface soil that includes protection of potable groundwater. The standard for F1 excludes benzene, toluene, ethylbenzene and xylenes.
Reference: Canadian Council of Ministers of the Environment, Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil, 2008. Table 1 - Summary of Tier 1 Levels for surface soil. / The most stringent guideline was used in this report.

Note 7.4 for F2 (C10-C16):
This Tier 1 Level is for fine, surface soil. "Fine" means fine-textured soil having a median grain size of <75 µm as defined by the American Society for Testing and Materials. Reference: Canadian Council of Ministers of the Environment, Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil, 2008. Table 1 - Summary of Tier 1 Levels for surface soil.
Note 7.5 for F3 (C16-C34):
This Tier 1 Level is for fine, surface soil. "Fine" means fine-textured soil having a median grain size of <75 µm as defined by the American Society for Testing and Materials. Reference: Canadian Council of Ministers of the Environment, Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil, 2008. Table 1 - Summary of Tier 1 Levels for surface soil.
Note 7.6 for F4 (CCME): (>C34-C50):
This Tier 1 Level is for fine, surface soil. "Fine" means fine-textured soil having a median grain size of <75 µm as defined by the American Society for Testing and Materials. Reference: Canadian Council of Ministers of the Environment, Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil, 2008. Table 1 - Summary of Tier 1 Levels for surface soil.
Note 7.7 for Toluene:
The guideline for toluene is 0.08 mg/kg for the following: • Surface soil with fine soil texture • Subsoil with fine soil texture
Note 7.8 for Xylene:
The guideline for xylenes is 2.4 mg/kg for the following: • Surface soil with fine soil texture • Subsoil with fine soil texture
Note 7.9 for Acenaphthene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Acenaphthene is 0.28 mg/kg based on non-carcinogenic effects (from Table 2 of CCME PAHs Factsheet 2010).
Note 7.10 for Acenaphthylene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Acenaphthylene is 320 mg/kg based on non-carcinogenic effects (from Table 2 of CCME PAHs Factsheet 2010).
Note 7.11 for Anthracene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Anthracene is 2.5 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).
Note 7.12 for Benz[a]anthracene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Benzo[a]anthracene is 1 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).

Note 7.13 for Benzo[a]pyrene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Benzo[a]pyrene is 20 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).
Note 7.14 for Benzo[g,h,i]perylene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. An environmental Soil Quality Guideline for Benzo[g,h,i]perylene based on non-carcinogenic effects is not available in Table 1 and 2 of CCME PAHs Factsheet 2010.
Note 7.15 for Benzo[k]fluoranthene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Benzo[k]fluoranthene is 1 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).
Note 7.16 for Chrysene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. An environmental Soil Quality Guideline for Chrysene based on non-carcinogenic effects is 6.2 mg/kg based on Table 2 of CCME PAHs Factsheet 2010.
Note 7.17 for Dibenz[a,h]anthracene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Dibenz[a,h]anthracene is 1 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).
Note 7.18 for Fluoranthene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Fluoranthene is 50 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).
Note 7.19 for Fluorene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Fluorene is 0.25 mg/kg based on non-carcinogenic effects (from Table 2 of CCME PAHs Factsheet 2010).
Note 7.20 for IACR (CCME):
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects.

Note 7.21 for Indeno[1,2,3-cd]pyrene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Indeno[1,2,3-cd]pyrene is 1 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).
Note 7.22 for Naphthalene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Naphthalene is 0.013 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).
Note 7.23 for Carcinogenic PAHs (as B(a)P TPE):
Guideline for B(A)P Total Potency Equivalent is 0.6 mg/kg based on an incremental lifetime cancer risk (ILCR) of 1 in 1,000,000 (10-6). Guideline for B(A)P Total Potency Equivalent is 5.3 mg/kg based on an incremental lifetime cancer risk (ILCR) of 1 in 100,000 (10-5). Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. For soil contaminated with coal tar or creosote mixtures, the calculated Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) concentration for soil samples should be multiplied by a safety factor of 3 prior to comparison with the guideline to account for carcinogenic potential of alkylated and other PAHs present for which a Potency Equivalence Factor (PEF) does not currently exist, but which are likely to contribute to mixture carcinogenic potential. / The most stringent guideline was used in this report.
Note 7.24 for Phenanthrene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Phenanthrene is 0.046 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).
Note 7.25 for Pyrene:
Assess the hazard to human health from carcinogenic effects of PAHs by doing steps 1 and 2. Step 1 is: Calculate a Benzo[a]pyrene Total Potency Equivalents (B[a]P TPE) to ensure that humans are protected from direct contact with contaminated soil. Step 2 is: Calculate the Index of Additive Cancer Risk (IACR) to ensure that potable water resources are protected. Assess the hazard to environmental health from non-carcinogenic effects of PAHs by doing step 3. Step 3 is: Compare PAHs individually to the appropriate environmental Soil Quality Guideline which were developed based on non-carcinogenic effects. The environmental Soil Quality Guideline for Pyrene is 10 mg/kg based on non-carcinogenic effects (from Table 1 of CCME PAHs Factsheet 2010).
Note 7.26 for Zinc:
Reference: Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health; Factsheet for Zinc, 2018. Data are sufficient and adequate to calculate guidelines for human health and environmental health. Therefore, the soil quality guideline is the lower of the two and supersedes the 1999 soil quality guideline and the 1991 interim remediation criteria for soil.



Approximate Sediment Sample Location

Laboratory Analytical Results Exceeding Applicable Guidelines

Water Lease Boundary

0 100 200 metres

1:4,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 11N
2. Base features: Geogratis, ©Department of Natural Resources Canada. All rights reserved.
3. Water Lot Boundaries depicted on figures are provided by ATLAS. Boundaries are expected to depict the ordinary high water mark during time of establishment of the lease.
4. The base image shows water levels at the time of image capture, which may differ from the water levels during water lot establishment.
5. Surface water and Sediment sample locations depicted on figures represent the shore water interface on the collection date.
6. A = Canadian Environmental Quality Guidelines, Sediment Quality Guidelines for the Protection of Aquatic Life, Interim Freshwater Sediment Quality Guideline

Stantec

Project Location
Hay River,
Northwest Territories

144930085
Prepared by SB on 2018-01-31
Technical Review by EB on 2018-02-01
Independent Review by DSM on 2018-02-02

Client/Project
Government of Northwest Territories - CSD
2017 MTS Properties
Limited Phase I/II Environmental Site Assessment

Figure No.
A5-10

Title
Hay River Water Lease 085B/13-019
Sample Location Plan Showing Sediment Sample Exceedances

SED-021-02		
Parameter	Arsenic (mg/kg)	Cadmium (mg/kg)
Guideline	5.9[A]	0.6[A]
Result	8.9	0.76

SED-021-01		
Parameter	Arsenic (mg/kg)	Acenaphthene (mg/kg)
Guideline	5.9[A]	0.00671[A]
Result	6.9	0.014

× Approximate Sediment Sample Location

Laboratory Analytical Results Exceeding Applicable Guidelines

Water Lease Boundary

0 25 50 metres

1:1,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 11N
2. Base features: Geogratis, ©Department of Natural Resources Canada. All rights reserved.
3. Water Lot Boundaries depicted on figures are provided by ATLAS. Boundaries are expected to depict the ordinary high water mark during time of establishment of the lease.
4. The base image shows water levels at the time of image capture, which may differ from the water levels during water lot establishment.
5. Surface water and Sediment sample locations depicted on figures represent the shore water interface on the collection date.
6. A - Canadian Environmental Quality Guidelines, Sediment Quality Guidelines for the Protection of Aquatic Life, Interim freshwater Sediment Quality Guideline

Stantec

Project Location
Hay River,
Northwest Territories

144930085
Prepared by SB on 2018-01-31
Technical Review by EB on 2018-02-01
Independent Review by DSM on 2018-02-02

Client/Project
Government of Northwest Territories - CSD
2017 MTS Properties
Limited Phase I/II Environmental Site Assessment

Figure No.
A5-11

Title
Hay River Water Lease 085B/13-021 Sample Location Plan Showing Sediment Sample Exceedances

I:\144930085_NTCL\gis\Mxd\Hay_River\144930085_Sed_WaterLease085B13-021_Fig_A5-11.mxd Revised: 2018-04-03 By: rgoldsmith\rjohn

Appendix D.5

Mackenzie Valley Land and Water Board Type B Water License (TO COME)

02 June 2023
1230258-P01-00-SPC-0001 Revision B

Appendix D.6
DFO Letter of Advice (TO COME)

02 June 2023
1230258-P01-00-SPC-0001 Revision B

Appendix D.7
Area A Soil Analyses

02 June 2023
1230258-P01-00-SPC-0001 Revision B

Your P.O. #: 2023-8356
Your Project #: 2023-8356
Site Location: HAY RIVER, NT
Your C.O.C. #: 1 of 1

Attention: JENNIFER HANSEN

ASSOCIATED ENVIRONMENTAL CONSULTANTS
500 - 9888 Jasper Avenue
Edmonton, AB
CANADA T5J 5C6

Report Date: 2023/01/30
Report #: R3293714
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C304724
Received: 2023/01/20, 11:30

Sample Matrix: Soil
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX/F1 by HS GC/MS/FID (MeOH extract) (1, 2)	5	N/A	2023/01/23	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX (1)	5	N/A	2023/01/25		Auto Calc
Hexavalent Chromium (1, 3)	5	2023/01/24	2023/01/25	AB SOP-00063	SM 23 3500-Cr B m
CCME Hydrocarbons (F2-F4 in soil) (1, 4)	5	2023/01/24	2023/01/25	AB SOP-00036	CCME PHC-CWS m
Elements by ICPMS - Soils (1)	5	2023/01/25	2023/01/26	AB SOP-00001 / AB SOP-00043	EPA 6020b R2 m
Moisture (1)	5	N/A	2023/01/25	AB SOP-00002	CCME PHC-CWS m
Index of Additive Cancer Risk (1, 5)	5	N/A	2023/01/25		Auto Calc
Benzo[a]pyrene Equivalency (1)	5	N/A	2023/01/25		Auto Calc
PAH in Soil by GC/MS (1)	5	2023/01/24	2023/01/25	AB SOP-00036 / AB SOP-00003	EPA 3540C/8270E m
Particle Size by Sieve (75 micron) (1)	5	N/A	2023/01/26		Auto Calc
Particle Size by Sieve (1)	5	N/A	2023/01/26	AB SOP-00022	ASTM D6913-17 m
Soluble Ions (1)	5	2023/01/26	2023/01/27	AB SOP-00033 / AB SOP-00042	EPA 6010d R5 m
Soluble Paste (1)	5	2023/01/26	2023/01/26	AB SOP-00033	Carter 2nd ed 15.2 m
Soluble Boron Calculation (1)	5	N/A	2023/01/27		Auto Calc
Texture by Hydrometer (1)	5	N/A	2023/01/27	AB SOP-00030	Carter 2nd ed 55.3 m
Texture Class (1)	5	N/A	2023/01/27		Auto Calc

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the

Your P.O. #: 2023-8356
Your Project #: 2023-8356
Site Location: HAY RIVER, NT
Your C.O.C. #: 1 of 1

Attention: JENNIFER HANSEN

ASSOCIATED ENVIRONMENTAL CONSULTANTS
500 - 9888 Jasper Avenue
Edmonton, AB
CANADA T5J 5C6

Report Date: 2023/01/30
Report #: R3293714
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C304724
Received: 2023/01/20, 11:30
customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8
(2) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is date sampled unless otherwise stated.
(3) Some soil samples may react with the Cr(VI) spike reducing it to Cr(III). These samples are highly unlikely to contain native hexavalent chromium. Thus a failed spike recovery does not invalidate a negative result on the native sample.
(4) All CCME results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil, Validation of Performance-Based Alternative Methods September 2003. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.
(5) Index of Additive Cancer Risk, (C) denotes coarse, (F) denotes fine.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Ioana Stoica, Key Account Specialist
Email: Ioana.Stoica@bureauveritas.com
Phone# (403)735-2227
==========
This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Scott Cantwell, General Manager responsible for Alberta Environmental laboratory operations.

Bureau Veritas Job #: C304724
Report Date: 2023/01/30

ASSOCIATED ENVIRONMENTAL CONSULTANTS
Client Project #: 2023-8356
Site Location: HAY RIVER, NT
Your P.O. #: 2023-8356
Sampler Initials: CG

RESULTS OF CHEMICAL ANALYSES OF SOIL

Bureau Veritas ID		BKQ530				BKQ531			
Sampling Date		2023/01/18 13:00				2023/01/18 13:15			
COC Number		1 of 1				1 of 1			
	UNITS	SAMPLE 01-A (1.9M-2.1M BELOW ICE)	MU	RDL	QC Batch	SAMPLE 01-B (2.5M-3.0M BELOW ICE)	MU	RDL	QC Batch
Calculated Parameters									
Calculated Boron (B)	mg/kg	0.080	N/A	0.037	A861176	0.065	N/A	0.033	A861176
Elements									
Hex. Chromium (Cr 6+)	mg/kg	<0.080	N/A	0.080	A862335	<0.080	N/A	0.080	A862335
Soluble Parameters									
Soluble Boron (B)	mg/L	0.22	+/- 0.12	0.10	A865360	0.20	+/- 0.12	0.10	A865360
Saturation %	%	37	+/- 2.9	N/A	A863410	33	+/- 2.5	N/A	A863410
Physical Properties									
Grain Size	N/A	COARSE	N/A	N/A	A860408	COARSE	N/A	N/A	A860408
Sieve - #10 (>2.00mm)	%	<0.20	N/A	0.20	A863690	<0.20	N/A	0.20	A863432
Sieve - #200 (>0.075mm)	%	66	N/A	0.20	A863690	85	N/A	0.20	A863432
Sieve - Pan	%	34	N/A	0.20	A863690	15	N/A	0.20	A863432

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C304724
Report Date: 2023/01/30

ASSOCIATED ENVIRONMENTAL CONSULTANTS
Client Project #: 2023-8356
Site Location: HAY RIVER, NT
Your P.O. #: 2023-8356
Sampler Initials: CG

RESULTS OF CHEMICAL ANALYSES OF SOIL

Bureau Veritas ID		BKQ531				BKQ532			
Sampling Date		2023/01/18 13:15				2023/01/18 13:30			
COC Number		1 of 1				1 of 1			
	UNITS	SAMPLE 01-B (2.5M-3.0M BELOW ICE) Lab-Dup	MU	RDL	QC Batch	SAMPLE 01-C (2.5M-3.0M BELOW ICE)	MU	RDL	QC Batch
Calculated Parameters									
Calculated Boron (B)	mg/kg	N/A	N/A	0.033	A861176	0.054	N/A	0.030	A861176
Elements									
Hex. Chromium (Cr 6+)	mg/kg	<0.080	N/A	0.080	A862335	<0.080	N/A	0.080	A862335
Soluble Parameters									
Soluble Boron (B)	mg/L	N/A	N/A	0.10	A865360	0.18	+/- 0.12	0.10	A865360
Saturation %	%	N/A	N/A	N/A	A863410	30	+/- 2.4	N/A	A863410
Physical Properties									
Grain Size	N/A	N/A	N/A	N/A	A860408	COARSE	N/A	N/A	A860408
Sieve - #10 (>2.00mm)	%	N/A	N/A	0.20	A863432	4.8	N/A	0.20	A863690
Sieve - #200 (>0.075mm)	%	N/A	N/A	0.20	A863432	85	N/A	0.20	A863690
Sieve - Pan	%	N/A	N/A	0.20	A863432	15	N/A	0.20	A863690

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
MU = Measurement Uncertainty
N/A = Not Applicable

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C304724
Report Date: 2023/01/30

ASSOCIATED ENVIRONMENTAL CONSULTANTS
Client Project #: 2023-8356
Site Location: HAY RIVER, NT
Your P.O. #: 2023-8356
Sampler Initials: CG

RESULTS OF CHEMICAL ANALYSES OF SOIL

Bureau Veritas ID		BKQ533				BKQ534			
Sampling Date		2023/01/18 14:00				2023/01/18 14:30			
COC Number		1 of 1				1 of 1			
	UNITS	SAMPLE 2 (1.7M-2.7M BELOW ICE)	MU	RDL	QC Batch	SAMPLE 3 (2.3M-3.0M BELOW ICE)	MU	RDL	QC Batch
Calculated Parameters									
Calculated Boron (B)	mg/kg	0.056	N/A	0.033	A861176	0.10	N/A	0.046	A861176
Elements									
Hex. Chromium (Cr 6+)	mg/kg	<0.080	N/A	0.080	A862335	<0.080	N/A	0.080	A862335
Soluble Parameters									
Soluble Boron (B)	mg/L	0.17	+/- 0.12	0.10	A865360	0.23	+/- 0.12	0.10	A865360
Saturation %	%	33	+/- 2.6	N/A	A863410	46	+/- 3.6	N/A	A863410
Physical Properties									
Grain Size	N/A	COARSE	N/A	N/A	A860408	COARSE	N/A	N/A	A860408
Sieve - #10 (>2.00mm)	%	<0.20	N/A	0.20	A863690	<0.20	N/A	0.20	A863432
Sieve - #200 (>0.075mm)	%	87	N/A	0.20	A863690	74	N/A	0.20	A863432
Sieve - Pan	%	13	N/A	0.20	A863690	26	N/A	0.20	A863432

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C304724
Report Date: 2023/01/30

ASSOCIATED ENVIRONMENTAL CONSULTANTS
Client Project #: 2023-8356
Site Location: HAY RIVER, NT
Your P.O. #: 2023-8356
Sampler Initials: CG

PETROLEUM HYDROCARBONS (CCME)

Bureau Veritas ID		BKQ530		BKQ530		BKQ531			
Sampling Date		2023/01/18 13:00		2023/01/18 13:00		2023/01/18 13:15			
COC Number		1 of 1		1 of 1		1 of 1			
	UNITS	SAMPLE 01-A (1.9M-2.1M BELOW ICE)	MU	SAMPLE 01-A (1.9M-2.1M BELOW ICE) Lab-Dup	MU	SAMPLE 01-B (2.5M-3.0M BELOW ICE)	MU	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	N/A	<10	N/A	<10	N/A	10	A862641
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	N/A	<50	N/A	<50	N/A	50	A862641
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	N/A	<50	N/A	<50	N/A	50	A862641
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	N/A	Yes	N/A	N/A	A862641
Surrogate Recovery (%)									
O-TERPHENYL (sur.)	%	98	N/A	93	N/A	101	N/A	N/A	A862641

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
MU = Measurement Uncertainty
N/A = Not Applicable

Bureau Veritas ID		BKQ532		BKQ533		BKQ534			
Sampling Date		2023/01/18 13:30		2023/01/18 14:00		2023/01/18 14:30			
COC Number		1 of 1		1 of 1		1 of 1			
	UNITS	SAMPLE 01-C (2.5M-3.0M BELOW ICE)	MU	SAMPLE 2 (1.7M-2.7M BELOW ICE)	MU	SAMPLE 3 (2.3M-3.0M BELOW ICE)	MU	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	N/A	<10	N/A	<10	N/A	10	A862641
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	N/A	<50	N/A	52	+/- <RDL	50	A862641
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	N/A	<50	N/A	<50	N/A	50	A862641
Reached Baseline at C50	mg/kg	Yes	N/A	Yes	N/A	Yes	N/A	N/A	A862641
Surrogate Recovery (%)									
O-TERPHENYL (sur.)	%	98	N/A	96	N/A	100	N/A	N/A	A862641

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C304724
Report Date: 2023/01/30

ASSOCIATED ENVIRONMENTAL CONSULTANTS
Client Project #: 2023-8356
Site Location: HAY RIVER, NT
Your P.O. #: 2023-8356
Sampler Initials: CG

PHYSICAL TESTING (SOIL)

Bureau Veritas ID		BKQ530		BKQ531		BKQ532			
Sampling Date		2023/01/18 13:00		2023/01/18 13:15		2023/01/18 13:30			
COC Number		1 of 1		1 of 1		1 of 1			
	UNITS	SAMPLE 01-A (1.9M-2.1M BELOW ICE)	MU	SAMPLE 01-B (2.5M-3.0M BELOW ICE)	MU	SAMPLE 01-C (2.5M-3.0M BELOW ICE)	MU	RDL	QC Batch
Physical Properties									
% sand by hydrometer	%	72	+/- 9.8	87	+/- 12	89	+/- 12	2.0	A865004
% silt by hydrometer	%	18	+/- 2.8	6.4	+/- <RDL	4.0	+/- <RDL	2.0	A865004
Clay Content	%	10	+/- 2.1	6.6	+/- <RDL	7.2	+/- <RDL	2.0	A865004
Texture	N/A	SANDY LOAM	N/A	LOAMY SAND	N/A	SAND	N/A	N/A	A860412
Moisture	%	23	+/- 1.6	19	+/- 1.4	18	+/- 1.3	0.30	A862099

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

Bureau Veritas ID		BKQ533		BKQ534			
Sampling Date		2023/01/18 14:00		2023/01/18 14:30			
COC Number		1 of 1		1 of 1			
	UNITS	SAMPLE 2 (1.7M-2.7M BELOW ICE)	MU	SAMPLE 3 (2.3M-3.0M BELOW ICE)	MU	RDL	QC Batch
Physical Properties							
% sand by hydrometer	%	90	+/- 12	72	+/- 9.8	2.0	A865004
% silt by hydrometer	%	4.1	+/- <RDL	14	+/- 2.2	2.0	A865004
Clay Content	%	5.7	+/- <RDL	14	+/- 2.8	2.0	A865004
Texture	N/A	SAND	N/A	SANDY LOAM	N/A	N/A	A860412
Moisture	%	17	+/- 1.3	22	+/- 1.5	0.30	A862099

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

Bureau Veritas ID		BKQ530		BKQ530			
Sampling Date		2023/01/18 13:00		2023/01/18 13:00			
COC Number		1 of 1		1 of 1			
	UNITS	SAMPLE 01-A (1.9M-2.1M BELOW ICE)	MU	SAMPLE 01-A (1.9M-2.1M BELOW ICE) Lab-Dup	MU	RDL	QC Batch
Polycyclic Aromatics							
Index of Additive Cancer Risk (C)	N/A	<0.10	N/A	N/A	N/A	0.10	A861193
Acenaphthene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
B[a]P TPE Total Potency Equivalents	mg/kg	<0.0071	N/A	N/A	N/A	0.0071	A860308
Index of Additive Cancer Risk (F)	N/A	<0.10	N/A	N/A	N/A	0.10	A861193
Acenaphthylene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Acridine	mg/kg	<0.010	N/A	<0.010	N/A	0.010	A862638
Anthracene	mg/kg	<0.0040	N/A	<0.0040	N/A	0.0040	A862638
Benzo(a)anthracene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(b&j)fluoranthene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(k)fluoranthene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(g,h,i)perylene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(c)phenanthrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(a)pyrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(e)pyrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Chrysene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Dibenz(a,h)anthracene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Fluoranthene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Fluorene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
1-Methylnaphthalene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
2-Methylnaphthalene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Naphthalene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Phenanthrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Perylene	mg/kg	0.041	+/- 0.013	0.033	+/- 0.011	0.0050	A862638
Pyrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Quinoline	mg/kg	<0.010	N/A	<0.010	N/A	0.010	A862638

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
MU = Measurement Uncertainty
N/A = Not Applicable

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C304724
Report Date: 2023/01/30

ASSOCIATED ENVIRONMENTAL CONSULTANTS
Client Project #: 2023-8356
Site Location: HAY RIVER, NT
Your P.O. #: 2023-8356
Sampler Initials: CG

SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

Bureau Veritas ID		BKQ530		BKQ530			
Sampling Date		2023/01/18 13:00		2023/01/18 13:00			
COC Number		1 of 1		1 of 1			
	UNITS	SAMPLE 01-A (1.9M-2.1M BELOW ICE)	MU	SAMPLE 01-A (1.9M-2.1M BELOW ICE) Lab-Dup	MU	RDL	QC Batch
Surrogate Recovery (%)							
D10-ANTHRACENE (sur.)	%	85	N/A	80	N/A	N/A	A862638
D8-ACENAPHTHYLENE (sur.)	%	97	N/A	94	N/A	N/A	A862638
D8-NAPHTHALENE (sur.)	%	84	N/A	73	N/A	N/A	A862638
TERPHENYL-D14 (sur.)	%	81	N/A	77	N/A	N/A	A862638

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
MU = Measurement Uncertainty
N/A = Not Applicable

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

Bureau Veritas ID		BKQ531		BKQ532			
Sampling Date		2023/01/18 13:15		2023/01/18 13:30			
COC Number		1 of 1		1 of 1			
	UNITS	SAMPLE 01-B (2.5M-3.0M BELOW ICE)	MU	SAMPLE 01-C (2.5M-3.0M BELOW ICE)	MU	RDL	QC Batch
Polycyclic Aromatics							
Index of Additive Cancer Risk (C)	N/A	<0.10	N/A	<0.10	N/A	0.10	A861193
Acenaphthene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
B[a]P TPE Total Potency Equivalents	mg/kg	<0.0071	N/A	<0.0071	N/A	0.0071	A860308
Index of Additive Cancer Risk (F)	N/A	<0.10	N/A	<0.10	N/A	0.10	A861193
Acenaphthylene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Acridine	mg/kg	<0.010	N/A	<0.010	N/A	0.010	A862638
Anthracene	mg/kg	<0.0040	N/A	<0.0040	N/A	0.0040	A862638
Benzo(a)anthracene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(b&j)fluoranthene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(k)fluoranthene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(g,h,i)perylene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(c)phenanthrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(a)pyrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(e)pyrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Chrysene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Dibenz(a,h)anthracene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Fluoranthene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Fluorene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
1-Methylnaphthalene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
2-Methylnaphthalene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Naphthalene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Phenanthrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Perylene	mg/kg	0.031	+/- 0.0099	0.025	+/- 0.0083	0.0050	A862638
Pyrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Quinoline	mg/kg	<0.010	N/A	<0.010	N/A	0.010	A862638

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

ASSOCIATED ENVIRONMENTAL CONSULTANTS
Client Project #: 2023-8356
Site Location: HAY RIVER, NT
Your P.O. #: 2023-8356
Sampler Initials: CG

SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

Bureau Veritas ID		BKQ531		BKQ532			
Sampling Date		2023/01/18 13:15		2023/01/18 13:30			
COC Number		1 of 1		1 of 1			
	UNITS	SAMPLE 01-B (2.5M-3.0M BELOW ICE)	MU	SAMPLE 01-C (2.5M-3.0M BELOW ICE)	MU	RDL	QC Batch
Surrogate Recovery (%)							
D10-ANTHRACENE (sur.)	%	85	N/A	90	N/A	N/A	A862638
D8-ACENAPHTHYLENE (sur.)	%	106	N/A	114	N/A	N/A	A862638
D8-NAPHTHALENE (sur.)	%	81	N/A	82	N/A	N/A	A862638
TERPHENYL-D14 (sur.)	%	79	N/A	83	N/A	N/A	A862638

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

Bureau Veritas ID		BKQ533		BKQ534			
Sampling Date		2023/01/18 14:00		2023/01/18 14:30			
COC Number		1 of 1		1 of 1			
	UNITS	SAMPLE 2 (1.7M-2.7M BELOW ICE)	MU	SAMPLE 3 (2.3M-3.0M BELOW ICE)	MU	RDL	QC Batch
Polycyclic Aromatics							
Index of Additive Cancer Risk (C)	N/A	<0.10	N/A	<0.10	N/A	0.10	A861193
Acenaphthene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
B[a]P TPE Total Potency Equivalents	mg/kg	<0.0071	N/A	<0.0071	N/A	0.0071	A860308
Index of Additive Cancer Risk (F)	N/A	<0.10	N/A	<0.10	N/A	0.10	A861193
Acenaphthylene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Acridine	mg/kg	<0.010	N/A	<0.010	N/A	0.010	A862638
Anthracene	mg/kg	<0.0040	N/A	<0.0040	N/A	0.0040	A862638
Benzo(a)anthracene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(b&j)fluoranthene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(k)fluoranthene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(g,h,i)perylene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(c)phenanthrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(a)pyrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Benzo(e)pyrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Chrysene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Dibenz(a,h)anthracene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Fluoranthene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Fluorene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
1-Methylnaphthalene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
2-Methylnaphthalene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Naphthalene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Phenanthrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Perylene	mg/kg	0.016	+/- 0.0053	0.050	+/- 0.016	0.0050	A862638
Pyrene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A862638
Quinoline	mg/kg	<0.010	N/A	<0.010	N/A	0.010	A862638

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

ASSOCIATED ENVIRONMENTAL CONSULTANTS
Client Project #: 2023-8356
Site Location: HAY RIVER, NT
Your P.O. #: 2023-8356
Sampler Initials: CG

SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

Bureau Veritas ID		BKQ533		BKQ534			
Sampling Date		2023/01/18 14:00		2023/01/18 14:30			
COC Number		1 of 1		1 of 1			
	UNITS	SAMPLE 2 (1.7M-2.7M BELOW ICE)	MU	SAMPLE 3 (2.3M-3.0M BELOW ICE)	MU	RDL	QC Batch
Surrogate Recovery (%)							
D10-ANTHRACENE (sur.)	%	83	N/A	91	N/A	N/A	A862638
D8-ACENAPHTHYLENE (sur.)	%	104	N/A	114	N/A	N/A	A862638
D8-NAPHTHALENE (sur.)	%	76	N/A	81	N/A	N/A	A862638
TERPHENYL-D14 (sur.)	%	76	N/A	83	N/A	N/A	A862638

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C304724
Report Date: 2023/01/30

ASSOCIATED ENVIRONMENTAL CONSULTANTS
Client Project #: 2023-8356
Site Location: HAY RIVER, NT
Your P.O. #: 2023-8356
Sampler Initials: CG

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Bureau Veritas ID		BKQ530		BKQ531			
Sampling Date		2023/01/18 13:00		2023/01/18 13:15			
COC Number		1 of 1		1 of 1			
	UNITS	SAMPLE 01-A (1.9M-2.1M BELOW ICE)	MU	SAMPLE 01-B (2.5M-3.0M BELOW ICE)	MU	RDL	QC Batch
Elements							
Total Antimony (Sb)	mg/kg	<0.50	N/A	<0.50	N/A	0.50	A863600
Total Arsenic (As)	mg/kg	6.6	+/- 1.2	6.1	+/- 1.1	1.0	A863600
Total Barium (Ba)	mg/kg	150	+/- 23	130	+/- 19	1.0	A863600
Total Beryllium (Be)	mg/kg	<0.40	N/A	<0.40	N/A	0.40	A863600
Total Cadmium (Cd)	mg/kg	0.30	+/- 0.062	0.21	+/- 0.057	0.050	A863600
Total Chromium (Cr)	mg/kg	7.5	+/- 1.7	5.7	+/- 1.4	1.0	A863600
Total Cobalt (Co)	mg/kg	5.8	+/- 0.93	4.8	+/- 0.77	0.50	A863600
Total Copper (Cu)	mg/kg	8.3	+/- 1.4	6.4	+/- 1.1	1.0	A863600
Total Lead (Pb)	mg/kg	4.5	+/- 0.79	3.7	+/- 0.66	0.50	A863600
Total Mercury (Hg)	mg/kg	<0.050	N/A	<0.050	N/A	0.050	A863600
Total Molybdenum (Mo)	mg/kg	0.97	+/- 0.47	0.83	+/- 0.46	0.40	A863600
Total Nickel (Ni)	mg/kg	13	+/- 2.5	9.7	+/- 1.9	1.0	A863600
Total Selenium (Se)	mg/kg	<0.50	N/A	<0.50	N/A	0.50	A863600
Total Silver (Ag)	mg/kg	<0.20	N/A	<0.20	N/A	0.20	A863600
Total Thallium (Tl)	mg/kg	<0.10	N/A	<0.10	N/A	0.10	A863600
Total Tin (Sn)	mg/kg	<1.0	N/A	<1.0	N/A	1.0	A863600
Total Uranium (U)	mg/kg	1.2	+/- <RDL	0.95	+/- <RDL	0.20	A863600
Total Vanadium (V)	mg/kg	14	+/- 3.8	11	+/- 3.2	1.0	A863600
Total Zinc (Zn)	mg/kg	49	+/- <RDL	35	+/- <RDL	10	A863600

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

Bureau Veritas Job #: C304724
Report Date: 2023/01/30

ASSOCIATED ENVIRONMENTAL CONSULTANTS
Client Project #: 2023-8356
Site Location: HAY RIVER, NT
Your P.O. #: 2023-8356
Sampler Initials: CG

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Bureau Veritas ID		BKQ532		BKQ533			
Sampling Date		2023/01/18 13:30		2023/01/18 14:00			
COC Number		1 of 1		1 of 1			
	UNITS	SAMPLE 01-C (2.5M-3.0M BELOW ICE)	MU	SAMPLE 2 (1.7M-2.7M BELOW ICE)	MU	RDL	QC Batch
Elements							
Total Antimony (Sb)	mg/kg	<0.50	N/A	<0.50	N/A	0.50	A863600
Total Arsenic (As)	mg/kg	5.0	+/- <RDL	5.0	+/- <RDL	1.0	A863600
Total Barium (Ba)	mg/kg	130	+/- 19	140	+/- 21	1.0	A863600
Total Beryllium (Be)	mg/kg	<0.40	N/A	<0.40	N/A	0.40	A863600
Total Cadmium (Cd)	mg/kg	0.23	+/- 0.058	0.16	+/- 0.055	0.050	A863600
Total Chromium (Cr)	mg/kg	5.5	+/- 1.3	5.5	+/- 1.3	1.0	A863600
Total Cobalt (Co)	mg/kg	4.0	+/- 0.64	4.1	+/- 0.66	0.50	A863600
Total Copper (Cu)	mg/kg	4.7	+/- <RDL	5.4	+/- <RDL	1.0	A863600
Total Lead (Pb)	mg/kg	3.0	+/- 0.55	3.0	+/- 0.55	0.50	A863600
Total Mercury (Hg)	mg/kg	<0.050	N/A	<0.050	N/A	0.050	A863600
Total Molybdenum (Mo)	mg/kg	0.69	+/- 0.45	0.64	+/- 0.45	0.40	A863600
Total Nickel (Ni)	mg/kg	8.2	+/- 1.7	8.5	+/- 1.7	1.0	A863600
Total Selenium (Se)	mg/kg	<0.50	N/A	<0.50	N/A	0.50	A863600
Total Silver (Ag)	mg/kg	<0.20	N/A	<0.20	N/A	0.20	A863600
Total Thallium (Tl)	mg/kg	<0.10	N/A	<0.10	N/A	0.10	A863600
Total Tin (Sn)	mg/kg	<1.0	N/A	<1.0	N/A	1.0	A863600
Total Uranium (U)	mg/kg	1.0	+/- <RDL	0.75	+/- <RDL	0.20	A863600
Total Vanadium (V)	mg/kg	9.4	+/- 2.7	9.9	+/- 2.8	1.0	A863600
Total Zinc (Zn)	mg/kg	40	+/- <RDL	29	+/- <RDL	10	A863600

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C304724
Report Date: 2023/01/30

ASSOCIATED ENVIRONMENTAL CONSULTANTS
Client Project #: 2023-8356
Site Location: HAY RIVER, NT
Your P.O. #: 2023-8356
Sampler Initials: CG

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Bureau Veritas ID		BKQ534			
Sampling Date		2023/01/18 14:30			
COC Number		1 of 1			
	UNITS	SAMPLE 3 (2.3M-3.0M BELOW ICE)	MU	RDL	QC Batch
Elements					
Total Antimony (Sb)	mg/kg	<0.50	N/A	0.50	A863600
Total Arsenic (As)	mg/kg	7.0	+/- 1.3	1.0	A863600
Total Barium (Ba)	mg/kg	160	+/- 23	1.0	A863600
Total Beryllium (Be)	mg/kg	<0.40	N/A	0.40	A863600
Total Cadmium (Cd)	mg/kg	0.30	+/- 0.062	0.050	A863600
Total Chromium (Cr)	mg/kg	8.4	+/- 1.8	1.0	A863600
Total Cobalt (Co)	mg/kg	6.9	+/- 1.1	0.50	A863600
Total Copper (Cu)	mg/kg	9.1	+/- 1.5	1.0	A863600
Total Lead (Pb)	mg/kg	5.1	+/- 0.89	0.50	A863600
Total Mercury (Hg)	mg/kg	<0.050	N/A	0.050	A863600
Total Molybdenum (Mo)	mg/kg	1.0	+/- 0.47	0.40	A863600
Total Nickel (Ni)	mg/kg	13	+/- 2.6	1.0	A863600
Total Selenium (Se)	mg/kg	<0.50	N/A	0.50	A863600
Total Silver (Ag)	mg/kg	<0.20	N/A	0.20	A863600
Total Thallium (Tl)	mg/kg	0.10	+/- <RDL	0.10	A863600
Total Tin (Sn)	mg/kg	<1.0	N/A	1.0	A863600
Total Uranium (U)	mg/kg	0.96	+/- <RDL	0.20	A863600
Total Vanadium (V)	mg/kg	15	+/- 4.2	1.0	A863600
Total Zinc (Zn)	mg/kg	47	+/- <RDL	10	A863600

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C304724
Report Date: 2023/01/30

ASSOCIATED ENVIRONMENTAL CONSULTANTS
Client Project #: 2023-8356
Site Location: HAY RIVER, NT
Your P.O. #: 2023-8356
Sampler Initials: CG

VOLATILE ORGANICS BY GC-MS (SOIL)

Bureau Veritas ID		BKQ530		BKQ531		BKQ532			
Sampling Date		2023/01/18 13:00		2023/01/18 13:15		2023/01/18 13:30			
COC Number		1 of 1		1 of 1		1 of 1			
	UNITS	SAMPLE 01-A (1.9M-2.1M BELOW ICE)	MU	SAMPLE 01-B (2.5M-3.0M BELOW ICE)	MU	SAMPLE 01-C (2.5M-3.0M BELOW ICE)	MU	RDL	QC Batch
Volatiles									
Xylenes (Total)	mg/kg	<0.045	N/A	<0.045	N/A	<0.045	N/A	0.045	A860508
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	<10	N/A	<10	N/A	10	A860508
Field Preserved Volatiles									
Benzene	mg/kg	<0.0050	N/A	<0.0050	N/A	<0.0050	N/A	0.0050	A861270
Toluene	mg/kg	<0.050	N/A	<0.050	N/A	<0.050	N/A	0.050	A861270
Ethylbenzene	mg/kg	<0.010	N/A	<0.010	N/A	<0.010	N/A	0.010	A861270
m & p-Xylene	mg/kg	<0.040	N/A	<0.040	N/A	<0.040	N/A	0.040	A861270
o-Xylene	mg/kg	<0.020	N/A	<0.020	N/A	<0.020	N/A	0.020	A861270
F1 (C6-C10)	mg/kg	<10	N/A	<10	N/A	<10	N/A	10	A861270
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	93	N/A	94	N/A	94	N/A	N/A	A861270
4-Bromofluorobenzene (sur.)	%	99	N/A	102	N/A	98	N/A	N/A	A861270
D10-o-Xylene (sur.)	%	116	N/A	121	N/A	118	N/A	N/A	A861270
D4-1,2-Dichloroethane (sur.)	%	107	N/A	108	N/A	106	N/A	N/A	A861270

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

Bureau Veritas Edmonton: 9331 - 48th Street T6B 2R4 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C304724
Report Date: 2023/01/30

ASSOCIATED ENVIRONMENTAL CONSULTANTS
Client Project #: 2023-8356
Site Location: HAY RIVER, NT
Your P.O. #: 2023-8356
Sampler Initials: CG

VOLATILE ORGANICS BY GC-MS (SOIL)

Bureau Veritas ID		BKQ533		BKQ534			
Sampling Date		2023/01/18 14:00		2023/01/18 14:30			
COC Number		1 of 1		1 of 1			
	UNITS	SAMPLE 2 (1.7M-2.7M BELOW ICE)	MU	SAMPLE 3 (2.3M-3.0M BELOW ICE)	MU	RDL	QC Batch
Volatiles							
Xylenes (Total)	mg/kg	<0.045	N/A	<0.045	N/A	0.045	A860508
F1 (C6-C10) - BTEX	mg/kg	<10	N/A	<10	N/A	10	A860508
Field Preserved Volatiles							
Benzene	mg/kg	<0.0050	N/A	<0.0050	N/A	0.0050	A861270
Toluene	mg/kg	<0.050	N/A	<0.050	N/A	0.050	A861270
Ethylbenzene	mg/kg	<0.010	N/A	<0.010	N/A	0.010	A861270
m & p-Xylene	mg/kg	<0.040	N/A	<0.040	N/A	0.040	A861270
o-Xylene	mg/kg	<0.020	N/A	<0.020	N/A	0.020	A861270
F1 (C6-C10)	mg/kg	<10	N/A	<10	N/A	10	A861270
Surrogate Recovery (%)							
1,4-Difluorobenzene (sur.)	%	97	N/A	95	N/A	N/A	A861270
4-Bromofluorobenzene (sur.)	%	107	N/A	99	N/A	N/A	A861270
D10-o-Xylene (sur.)	%	117	N/A	119	N/A	N/A	A861270
D4-1,2-Dichloroethane (sur.)	%	112	N/A	108	N/A	N/A	A861270

RDL = Reportable Detection Limit
MU = Measurement Uncertainty
N/A = Not Applicable

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.7°C

The estimate of uncertainty has been reported as an expanded uncertainty and calculated using a coverage factor of 2, which gives a level of confidence of 95%.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A861270	WPK	Matrix Spike	1,4-Difluorobenzene (sur.)	2023/01/23		91	%	50 - 140
			4-Bromofluorobenzene (sur.)	2023/01/23		101	%	50 - 140
			D10-o-Xylene (sur.)	2023/01/23		123	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2023/01/23		105	%	50 - 140
			Benzene	2023/01/23		108	%	50 - 140
			Toluene	2023/01/23		110	%	50 - 140
			Ethylbenzene	2023/01/23		117	%	50 - 140
			m & p-Xylene	2023/01/23		116	%	50 - 140
			o-Xylene	2023/01/23		112	%	50 - 140
			F1 (C6-C10)	2023/01/23		92	%	60 - 140
A861270	WPK	Spiked Blank	1,4-Difluorobenzene (sur.)	2023/01/23		90	%	50 - 140
			4-Bromofluorobenzene (sur.)	2023/01/23		105	%	50 - 140
			D10-o-Xylene (sur.)	2023/01/23		111	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2023/01/23		103	%	50 - 140
			Benzene	2023/01/23		104	%	60 - 130
			Toluene	2023/01/23		105	%	60 - 130
			Ethylbenzene	2023/01/23		105	%	60 - 130
			m & p-Xylene	2023/01/23		114	%	60 - 130
			o-Xylene	2023/01/23		113	%	60 - 130
			F1 (C6-C10)	2023/01/23		110	%	60 - 140
A861270	WPK	Method Blank	1,4-Difluorobenzene (sur.)	2023/01/23		93	%	50 - 140
			4-Bromofluorobenzene (sur.)	2023/01/23		101	%	50 - 140
			D10-o-Xylene (sur.)	2023/01/23		110	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2023/01/23		105	%	50 - 140
			Benzene	2023/01/23	<0.0050		mg/kg	
			Toluene	2023/01/23	<0.050		mg/kg	
			Ethylbenzene	2023/01/23	<0.010		mg/kg	
			m & p-Xylene	2023/01/23	<0.040		mg/kg	
			o-Xylene	2023/01/23	<0.020		mg/kg	
			F1 (C6-C10)	2023/01/23	<10		mg/kg	
A861270	WPK	RPD	Benzene	2023/01/23	2.6		%	50
			Toluene	2023/01/23	NC		%	50
			Ethylbenzene	2023/01/23	NC		%	50
			m & p-Xylene	2023/01/23	NC		%	50
			o-Xylene	2023/01/23	NC		%	50
			F1 (C6-C10)	2023/01/23	NC		%	30
A862099	KLG	Method Blank	Moisture	2023/01/25	<0.30		%	
A862099	KLG	RPD	Moisture	2023/01/25	1.2		%	20
A862335	GPJ	Matrix Spike [BKQ531-01]	Hex. Chromium (Cr 6+)	2023/01/25		83	%	75 - 125
A862335	GPJ	Spiked Blank	Hex. Chromium (Cr 6+)	2023/01/25		95	%	80 - 120
A862335	GPJ	Method Blank	Hex. Chromium (Cr 6+)	2023/01/25	<0.080		mg/kg	
A862335	GPJ	RPD [BKQ531-01]	Hex. Chromium (Cr 6+)	2023/01/25	NC		%	35
A862638	NK3	Matrix Spike [BKQ530-01]	D10-ANTHRACENE (sur.)	2023/01/25		79	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2023/01/25		92	%	50 - 130
			D8-NAPHTHALENE (sur.)	2023/01/25		72	%	50 - 130
			TERPHENYL-D14 (sur.)	2023/01/25		74	%	50 - 130
			Acenaphthene	2023/01/25		69	%	50 - 130
			Acenaphthylene	2023/01/25		80	%	50 - 130
			Acridine	2023/01/25		49 (1)	%	50 - 130
			Anthracene	2023/01/25		73	%	50 - 130
			Benzo(a)anthracene	2023/01/25		75	%	50 - 130
			Benzo(b&j)fluoranthene	2023/01/25		70	%	50 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(k)fluoranthene	2023/01/25		65	%	50 - 130
			Benzo(g,h,i)perylene	2023/01/25		71	%	50 - 130
			Benzo(c)phenanthrene	2023/01/25		76	%	50 - 130
			Benzo(a)pyrene	2023/01/25		76	%	50 - 130
			Benzo(e)pyrene	2023/01/25		66	%	50 - 130
			Chrysene	2023/01/25		71	%	50 - 130
			Dibenz(a,h)anthracene	2023/01/25		72	%	50 - 130
			Fluoranthene	2023/01/25		74	%	50 - 130
			Fluorene	2023/01/25		78	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2023/01/25		77	%	50 - 130
			1-Methylnaphthalene	2023/01/25		64	%	50 - 130
			2-Methylnaphthalene	2023/01/25		81	%	50 - 130
			Naphthalene	2023/01/25		75	%	50 - 130
			Phenanthrene	2023/01/25		73	%	50 - 130
			Perylene	2023/01/25		63	%	50 - 130
			Pyrene	2023/01/25		74	%	50 - 130
			Quinoline	2023/01/25		87	%	50 - 130
A862638	NK3	Spiked Blank	D10-ANTHRACENE (sur.)	2023/01/25		90	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2023/01/25		106	%	50 - 130
			D8-NAPHTHALENE (sur.)	2023/01/25		81	%	50 - 130
			TERPHENYL-D14 (sur.)	2023/01/25		75	%	50 - 130
			Acenaphthene	2023/01/25		75	%	50 - 130
			Acenaphthylene	2023/01/25		89	%	50 - 130
			Acridine	2023/01/25		55	%	50 - 130
			Anthracene	2023/01/25		82	%	50 - 130
			Benzo(a)anthracene	2023/01/25		78	%	50 - 130
			Benzo(b&j)fluoranthene	2023/01/25		76	%	50 - 130
			Benzo(k)fluoranthene	2023/01/25		70	%	50 - 130
			Benzo(g,h,i)perylene	2023/01/25		85	%	50 - 130
			Benzo(c)phenanthrene	2023/01/25		76	%	50 - 130
			Benzo(a)pyrene	2023/01/25		90	%	50 - 130
			Benzo(e)pyrene	2023/01/25		71	%	50 - 130
			Chrysene	2023/01/25		70	%	50 - 130
			Dibenz(a,h)anthracene	2023/01/25		88	%	50 - 130
			Fluoranthene	2023/01/25		83	%	50 - 130
			Fluorene	2023/01/25		84	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2023/01/25		96	%	50 - 130
			1-Methylnaphthalene	2023/01/25		69	%	50 - 130
			2-Methylnaphthalene	2023/01/25		87	%	50 - 130
			Naphthalene	2023/01/25		81	%	50 - 130
			Phenanthrene	2023/01/25		79	%	50 - 130
			Perylene	2023/01/25		74	%	50 - 130
			Pyrene	2023/01/25		83	%	50 - 130
			Quinoline	2023/01/25		83	%	50 - 130
A862638	NK3	Method Blank	D10-ANTHRACENE (sur.)	2023/01/25		85	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2023/01/25		98	%	50 - 130
			D8-NAPHTHALENE (sur.)	2023/01/25		75	%	50 - 130
			TERPHENYL-D14 (sur.)	2023/01/25		75	%	50 - 130
			Acenaphthene	2023/01/25	<0.0050		mg/kg	
			Acenaphthylene	2023/01/25	<0.0050		mg/kg	
			Acridine	2023/01/25	<0.010		mg/kg	
			Anthracene	2023/01/25	<0.0040		mg/kg	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(a)anthracene	2023/01/25	<0.0050		mg/kg	
			Benzo(b&j)fluoranthene	2023/01/25	<0.0050		mg/kg	
			Benzo(k)fluoranthene	2023/01/25	<0.0050		mg/kg	
			Benzo(g,h,i)perylene	2023/01/25	<0.0050		mg/kg	
			Benzo(c)phenanthrene	2023/01/25	<0.0050		mg/kg	
			Benzo(a)pyrene	2023/01/25	<0.0050		mg/kg	
			Benzo(e)pyrene	2023/01/25	<0.0050		mg/kg	
			Chrysene	2023/01/25	<0.0050		mg/kg	
			Dibenz(a,h)anthracene	2023/01/25	<0.0050		mg/kg	
			Fluoranthene	2023/01/25	<0.0050		mg/kg	
			Fluorene	2023/01/25	<0.0050		mg/kg	
			Indeno(1,2,3-cd)pyrene	2023/01/25	<0.0050		mg/kg	
			1-Methylnaphthalene	2023/01/25	<0.0050		mg/kg	
			2-Methylnaphthalene	2023/01/25	<0.0050		mg/kg	
			Naphthalene	2023/01/25	<0.0050		mg/kg	
			Phenanthrene	2023/01/25	<0.0050		mg/kg	
			Perylene	2023/01/25	<0.0050		mg/kg	
			Pyrene	2023/01/25	<0.0050		mg/kg	
			Quinoline	2023/01/25	<0.010		mg/kg	
A862638	NK3	RPD [BKQ530-01]	Acenaphthene	2023/01/25	NC		%	50
			Acenaphthylene	2023/01/25	NC		%	50
			Acridine	2023/01/25	NC		%	50
			Anthracene	2023/01/25	NC		%	50
			Benzo(a)anthracene	2023/01/25	NC		%	50
			Benzo(b&j)fluoranthene	2023/01/25	NC		%	50
			Benzo(k)fluoranthene	2023/01/25	NC		%	50
			Benzo(g,h,i)perylene	2023/01/25	NC		%	50
			Benzo(c)phenanthrene	2023/01/25	NC		%	50
			Benzo(a)pyrene	2023/01/25	NC		%	50
			Benzo(e)pyrene	2023/01/25	NC		%	50
			Chrysene	2023/01/25	NC		%	50
			Dibenz(a,h)anthracene	2023/01/25	NC		%	50
			Fluoranthene	2023/01/25	NC		%	50
			Fluorene	2023/01/25	NC		%	50
			Indeno(1,2,3-cd)pyrene	2023/01/25	NC		%	50
			1-Methylnaphthalene	2023/01/25	NC		%	50
			2-Methylnaphthalene	2023/01/25	NC		%	50
			Naphthalene	2023/01/25	NC		%	50
			Phenanthrene	2023/01/25	NC		%	50
			Perylene	2023/01/25	21		%	50
			Pyrene	2023/01/25	NC		%	50
			Quinoline	2023/01/25	NC		%	50
A862641	GG3	Matrix Spike [BKQ530-01]	O-TERPHENYL (sur.)	2023/01/25		106	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2023/01/25		99	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2023/01/25		101	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2023/01/25		97	%	60 - 140
A862641	GG3	Spiked Blank	O-TERPHENYL (sur.)	2023/01/25		105	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2023/01/25		98	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2023/01/25		99	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2023/01/25		97	%	60 - 140
A862641	GG3	Method Blank	O-TERPHENYL (sur.)	2023/01/25		98	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2023/01/25	<10		mg/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			F3 (C16-C34 Hydrocarbons)	2023/01/25	<50		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2023/01/25	<50		mg/kg	
A862641	GG3	RPD [BKQ530-01]	F2 (C10-C16 Hydrocarbons)	2023/01/25	NC		%	40
			F3 (C16-C34 Hydrocarbons)	2023/01/25	NC		%	40
			F4 (C34-C50 Hydrocarbons)	2023/01/25	NC		%	40
A863410	HAP	QC Standard	Saturation %	2023/01/26		102	%	75 - 125
A863410	HAP	RPD	Saturation %	2023/01/26	7.4		%	12
A863432	RDL	QC Standard	Sieve - #200 (>0.075mm)	2023/01/26		102	%	75 - 125
			Sieve - Pan	2023/01/26		99	%	75 - 125
A863432	RDL	RPD	Sieve - #10 (>2.00mm)	2023/01/26	127 (1)		%	30
			Sieve - #200 (>0.075mm)	2023/01/26	0.93		%	30
			Sieve - Pan	2023/01/26	0.68		%	30
A863600	JAB	Matrix Spike	Total Antimony (Sb)	2023/01/26		89	%	75 - 125
			Total Arsenic (As)	2023/01/26		88	%	75 - 125
			Total Barium (Ba)	2023/01/26		NC	%	75 - 125
			Total Beryllium (Be)	2023/01/26		100	%	75 - 125
			Total Cadmium (Cd)	2023/01/26		93	%	75 - 125
			Total Chromium (Cr)	2023/01/26		138 (1)	%	75 - 125
			Total Cobalt (Co)	2023/01/26		95	%	75 - 125
			Total Copper (Cu)	2023/01/26		93	%	75 - 125
			Total Lead (Pb)	2023/01/26		93	%	75 - 125
			Total Mercury (Hg)	2023/01/26		82	%	75 - 125
			Total Molybdenum (Mo)	2023/01/26		101	%	75 - 125
			Total Nickel (Ni)	2023/01/26		99	%	75 - 125
			Total Selenium (Se)	2023/01/26		86	%	75 - 125
			Total Silver (Ag)	2023/01/26		96	%	75 - 125
			Total Thallium (Tl)	2023/01/26		91	%	75 - 125
			Total Tin (Sn)	2023/01/26		99	%	75 - 125
			Total Uranium (U)	2023/01/26		85	%	75 - 125
			Total Vanadium (V)	2023/01/26		188 (1)	%	75 - 125
			Total Zinc (Zn)	2023/01/26		NC	%	75 - 125
A863600	JAB	QC Standard	Total Antimony (Sb)	2023/01/26		120	%	15 - 182
			Total Arsenic (As)	2023/01/26		97	%	53 - 147
			Total Barium (Ba)	2023/01/26		98	%	80 - 119
			Total Cadmium (Cd)	2023/01/26		91	%	72 - 128
			Total Chromium (Cr)	2023/01/26		104	%	59 - 141
			Total Cobalt (Co)	2023/01/26		97	%	58 - 142
			Total Copper (Cu)	2023/01/26		101	%	83 - 117
			Total Lead (Pb)	2023/01/26		106	%	79 - 121
			Total Molybdenum (Mo)	2023/01/26		108	%	67 - 133
			Total Nickel (Ni)	2023/01/26		102	%	79 - 121
			Total Silver (Ag)	2023/01/26		109	%	47 - 153
			Total Tin (Sn)	2023/01/26		96	%	67 - 133
			Total Uranium (U)	2023/01/26		92	%	77 - 123
			Total Vanadium (V)	2023/01/26		104	%	79 - 121
			Total Zinc (Zn)	2023/01/26		97	%	79 - 121
A863600	JAB	Spiked Blank	Total Antimony (Sb)	2023/01/26		109	%	80 - 120
			Total Arsenic (As)	2023/01/26		96	%	80 - 120
			Total Barium (Ba)	2023/01/26		102	%	80 - 120
			Total Beryllium (Be)	2023/01/26		101	%	80 - 120
			Total Cadmium (Cd)	2023/01/26		97	%	80 - 120
			Total Chromium (Cr)	2023/01/26		103	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Cobalt (Co)	2023/01/26		103	%	80 - 120
			Total Copper (Cu)	2023/01/26		103	%	80 - 120
			Total Lead (Pb)	2023/01/26		102	%	80 - 120
			Total Mercury (Hg)	2023/01/26		105	%	80 - 120
			Total Molybdenum (Mo)	2023/01/26		104	%	80 - 120
			Total Nickel (Ni)	2023/01/26		102	%	80 - 120
			Total Selenium (Se)	2023/01/26		95	%	80 - 120
			Total Silver (Ag)	2023/01/26		102	%	80 - 120
			Total Thallium (Tl)	2023/01/26		103	%	80 - 120
			Total Tin (Sn)	2023/01/26		103	%	80 - 120
			Total Uranium (U)	2023/01/26		102	%	80 - 120
			Total Vanadium (V)	2023/01/26		103	%	80 - 120
			Total Zinc (Zn)	2023/01/26		97	%	80 - 120
A863600	JAB	Method Blank	Total Antimony (Sb)	2023/01/26	<0.50		mg/kg	
			Total Arsenic (As)	2023/01/26	<1.0		mg/kg	
			Total Barium (Ba)	2023/01/26	<1.0		mg/kg	
			Total Beryllium (Be)	2023/01/26	<0.40		mg/kg	
			Total Cadmium (Cd)	2023/01/26	<0.050		mg/kg	
			Total Chromium (Cr)	2023/01/26	<1.0		mg/kg	
			Total Cobalt (Co)	2023/01/26	<0.50		mg/kg	
			Total Copper (Cu)	2023/01/26	<1.0		mg/kg	
			Total Lead (Pb)	2023/01/26	<0.50		mg/kg	
			Total Mercury (Hg)	2023/01/26	<0.050		mg/kg	
			Total Molybdenum (Mo)	2023/01/26	<0.40		mg/kg	
			Total Nickel (Ni)	2023/01/26	<1.0		mg/kg	
			Total Selenium (Se)	2023/01/26	<0.50		mg/kg	
			Total Silver (Ag)	2023/01/26	<0.20		mg/kg	
			Total Thallium (Tl)	2023/01/26	<0.10		mg/kg	
			Total Tin (Sn)	2023/01/26	<1.0		mg/kg	
			Total Uranium (U)	2023/01/26	<0.20		mg/kg	
			Total Vanadium (V)	2023/01/26	<1.0		mg/kg	
			Total Zinc (Zn)	2023/01/26	<10		mg/kg	
A863600	JAB	RPD	Total Antimony (Sb)	2023/01/26	5.7		%	30
			Total Arsenic (As)	2023/01/26	0.88		%	30
			Total Barium (Ba)	2023/01/26	0.75		%	35
			Total Beryllium (Be)	2023/01/26	4.0		%	30
			Total Cadmium (Cd)	2023/01/26	2.4		%	30
			Total Chromium (Cr)	2023/01/26	3.6		%	30
			Total Cobalt (Co)	2023/01/26	6.7		%	30
			Total Copper (Cu)	2023/01/26	3.2		%	30
			Total Lead (Pb)	2023/01/26	0.40		%	35
			Total Mercury (Hg)	2023/01/26	0.54		%	35
			Total Molybdenum (Mo)	2023/01/26	0.50		%	35
			Total Nickel (Ni)	2023/01/26	2.5		%	30
			Total Selenium (Se)	2023/01/26	NC		%	30
			Total Silver (Ag)	2023/01/26	NC		%	35
			Total Thallium (Tl)	2023/01/26	0.51		%	30
			Total Tin (Sn)	2023/01/26	NC		%	35
			Total Uranium (U)	2023/01/26	2.7		%	30
			Total Vanadium (V)	2023/01/26	0.26		%	30
			Total Zinc (Zn)	2023/01/26	2.2		%	30
A863690	RDL	QC Standard	Sieve - #200 (>0.075mm)	2023/01/26		99	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Sieve - Pan	2023/01/26		101	%	75 - 125
A863690	RDL	RPD	Sieve - #10 (>2.00mm)	2023/01/26	NC		%	30
			Sieve - #200 (>0.075mm)	2023/01/26	4.6		%	30
			Sieve - Pan	2023/01/26	23		%	30
A865004	VSO	QC Standard	% sand by hydrometer	2023/01/27		99	%	75 - 125
			% silt by hydrometer	2023/01/27		103	%	75 - 125
			Clay Content	2023/01/27		100	%	75 - 125
A865004	VSO	RPD	% sand by hydrometer	2023/01/27	16		%	30
			% silt by hydrometer	2023/01/27	4.8		%	30
			Clay Content	2023/01/27	1.1		%	30
A865360	PL	Matrix Spike	Soluble Boron (B)	2023/01/27		89	%	75 - 125
A865360	PL	Spiked Blank	Soluble Boron (B)	2023/01/27		91	%	80 - 120
A865360	PL	Method Blank	Soluble Boron (B)	2023/01/27	<0.10		mg/L	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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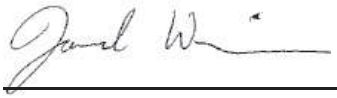
Bureau Veritas Job #: C304724
Report Date: 2023/01/30

ASSOCIATED ENVIRONMENTAL CONSULTANTS
Client Project #: 2023-8356
Site Location: HAY RIVER, NT
Your P.O. #: 2023-8356
Sampler Initials: CG

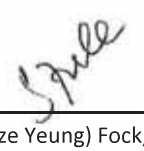
VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics



Jared Wiseman, B.Sc., P.Chem., QP, Senior Analyst, Organics



Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

Automated Statchk

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0560

CHAIN OF CUSTODY RECORD

ENV COC - 00013v3

20-Jan-23 11:30
Ioana Stoica
C304724

EAS INS-0001

Invoice Information	Invoice to (requires report) ☐	Report Information (if differs from invoice)		Project Information	
Company:	Associated Environmental	Company:		Quotation #:	
Contact Name:	Jennifer Brown	Contact Name:		P.O. #/ AFE#:	2023-8356
Street Address:	500-9888 Jasper Ave	Street Address:		Project #:	2023-8356
City: Edmonton Prov: AB Postal Code:	T5J-5C6	City: Prov: Postal Code:		Site #:	
Phone:	1-778-506-2160	Phone:		Site Location:	Hay River, NT
Email:	brownj@ae.ca	Email:		Site Location Province:	
Copies:		Copies:		Sampled By:	Chuck Gordon, Mike Weldon

Regulatory Criteria

☐ AT1 ☐ CCME ☐ Drinking Water - Canada ☐ Drinking Water - Manitoba
☐ Saskatchewan ☐ Drinking Water - Alberta ☐ Other _____

SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

Regular Turnaround Time (TAT)
☒ 5 to 7 Day ☐ 10 Day

Rush Turnaround Time (TAT) Surcharges apply
☐ Same Day ☐ 1 Day ☐ 2 Day ☐ 3 Day ☐ 4 Day

Date Required: YY MM DD

	Sample Identification	Date Sampled YY	MM	DD	Time (24hr) HH	MM	Matrix	1 FIELD FILTERED	2 FIELD PRESERVED	3 LAB FILTRATION REQUIRED	4 BTEX F1	5 VOCs	6 BTEX F1-F2	7 Bv2020	8 Routine water	9 Regulated metals - total	10 Regulated metals - dissolved	11 Mercury - total	12 Mercury - dissolved	13 Salinity 4	14 Sieve (75 micron)	15 Texture (% sand, silt, clay)	16 Basic class II landfill	17 BTEX F1-F4	18 PAH	19 PSA	20 Moisture	21 # OF CONTAINERS SUBMITTED	22 HOLD - DO NOT ANALYZE	Comments
1	Sample 01-A (1.9m-2.1m Below Ice)	23	01	18	13	00										X						X		X	X	X	X	3		
2	Sample 01-B (2.5m-3.0m Below Ice)	23	01	18	13	15										X						X		X	X	X	X	3		
3	Sample 01-C (2.5m-3.0m Below Ice)	23	01	18	13	30										X						X		X	X	X	X	3		
4	Sample 2(1.7m-2.7m Below Ice)	23	01	18	14	00										X						X		X	X	X	X	3		
5	Sample 3(2.3m-3.0 Below Ice)	23	01	18	14	30										X						X		X	X	X	X	3		
6																														
7																														
8																														
9																														
10																														
11																														
12																														

Received: Yellowknife
By: J. Mccomb @ 4:30
JAN 20 2023
ICE-YCR YKS-N
Temp: 7/4/6

*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present	/					
Seal intact	/					
Cooling media present	/			2.5	4.2	4.4

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal intact						
Cooling media present						

LAB USE ONLY	Yes	No	°C	1	2	3	Temperature reading by:
Seal present							
Seal intact							
Cooling media present							

	Relinquished by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Received by: (Signature/ Print)	Date YY	MM	DD	Time HH	MM	Special Instructions
1		23	01	18	11	30	1 EFREN ASTORGA	2023	01	21	14	15	
2							2						