K'alo-Stantec

Memo

To:	MGM Energy	From:	James Hymers, Project Manager K'alo-Stantec Ltd.
	2800, 421-7 Avenue SW Calgary, AB T2P 4K9		Tulita, NT, Canada X0E 0T0
File:	123514551	Date:	January 22, 2024

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

The Nogha K-14 Wellsite Area and Sump Area (collectively called the Site) are located in the Sahtu Settlement Area (SSA), Northwest Territories (NT), approximately 147 kilometres (km) north of Norman Wells (Attachment A: Figure A.1). The Wellsite Area is 1.4 hectares (ha) and contains a wellhead. The Sump Area is 0.15 ha and contains a drilling sump. (Attachment A: Figure A.2 and Figure A.3). Photos of the Site are provided in Attachment B as Photo B.1 to Photo B.23.

Table 1 2023 Site Specifications

Site	Nogha K-14 Wellsite and Sump	**Coordinates** (centre point)	66° 33' 36.9396" N and 126° 03' 18.8208" W		
Permittee	MGM Energy		**Contractor**	K'alo Stantec Ltd.	
Land Use Permit #	S19A-004	**Expiry Date** June 6, 2026	**Water License #**	S19L1-003	**Expiry Date** June 6, 2026
Site Assessors	Lionel Borges, B.Sc.		**Monitoring Date**	August 30, 2023	
Type of Inspection	☒ Ground ☒ Aerial	**Current Stage of Remediation/ Reclamation**	☒ In progress ☐ Planned ☐ Complete	**Locations Inspected**	☒ Well Site ☒ Sump ☐ Staging Area
Summary of Ongoing Work Completed to Date	☐ Decommissioning ☐ Erosion Control ☐ Excavation/Capping ☒ Phytoremediation ☒ Seeded ☐ Planted ☐ Other		**Key Issues**	☐ No issues ☒ On-Site Materials ☐ Wastes/Spills ☐ Erosion ☒ Terrain Conditions ☒ Soil Exceedances ☐ Water Exceedances ☒ Vegetation ☒ Wildlife Signs	**Recommended for:** ☐ Closure ☐ No further environmental monitoring or remediation/ reclamation treatments until closure ☒ Additional monitoring only (see Table 3) ☐ Additional treatment and monitoring

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

1 Key Findings and Recommendations

Upon arrival at the Site, the field team visually assessed the Site. Observations and measurements of on-site conditions, including GPS locations, were recorded on field forms, and documented with photographs (Attachment B). Soil samples were collected from the Wellsite Area and south of the wellhead. Laboratory analytical results are summarized in Attachment C and a copy of the laboratory certificate of analysis is presented in Attachment D.

A summary of observed conditions in 2023 is provided in Table 2. Key findings and recommendations are summarized in Table 3.

Table 2 Summary of 2023 Environmental Monitoring

Parameter	Observation	
	Well Site	Sump
On-Site Materials	A[a]	A
Erosion Control/Drainage	A	A
Terrain Conditions	A	IP
Soil	IP	IP
Standing Water	N/A	IP
Vegetation Cover	A	A
Invasive Plants/Weeds	A	A
Wildlife Signs of Use	A	A

Notes:
'A' = Acceptable – meeting permit/license conditions, no further work required at this time

- Water – at or below Canadian Council of Ministers of the Environment (CCME) Freshwater Guidelines[1]
- Soils – at or below Government of Northwest Territories (GNWT) Environmental Quality Guidelines[2] and Alberta Environment, Salt Contamination Assessment and Remediation Guidelines[3].
- Vegetation – 70% vegetation cover and no weed treatment

'IP'= In Progress - Further work required
'N/A' = Not Applicable
'NI' = Not Inspected, planned for future work

[a] A wellhead was still present on the Site. It appeared to be in acceptable condition as per permit requirements at the time of the site visit.

[1] CCME, 2023. *Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health*. Available from http://ceqg-rcqe.ccme.ca/. Last checked on May 2023.
[2] Government of Northwest Territories. 2003. *Environmental Guideline for Contaminated Site Remediation.* Residential/Parkland.
[3] Alberta Environment. 2001. *Salt Contamination Assessment and Remediation Guidelines*. Table 2.2. Soil Quality Guidelines for Unrestricted Land Use – Topsoil.

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Table 3 2023 Summary of Key Findings and Recommendations

Parameters	Monitoring Observations and Results	Soil and Water Analytical Results (if exceedances)	Future Recommended Work
On-Site Materials	**Wellsite Area:** • The Wellsite Area contained a wellhead, protective culvert and top grating located around the base of the wellhead (Attachment B: Photo B.4). • A total of six wallows have been present in the Wellsite Area since 2015 (when Stantec commenced monitoring). Remote cameras were installed adjacent to the two largest ones to document wildlife use of the wallows. • A remote camera was present adjacent to Wallow 1 and another camera was present adjacent to the Well Centre Wallow (WC Wallow) (Attachment A: Figure A.2 and Figure A.3; Attachment B: Photo B.1). – The camera adjacent to Wallow 1 was knocked out of position on June 19, 2023 by two black bears fighting next to the camera location. This resulted in no wildlife photos taken for the remainder of 2023. The camera was re-installed into position during the 2023 site visit. – The camera adjacent to the WC Wallow was knocked out of position on May 8, 2023 by an animal. This resulted in no wildlife photos taken for the remainder of 2023. The camera was re-installed into position during the 2023 site visit. • Coarse woody debris was present on the WC Wallow, Wallow 1, and Wallow 2. The debris was spread on those areas as part of reclamation treatments. • No other surface structures, materials, or waste were observed within the remainder of the Wellsite Area during the 2023 site visit. **Sump Area:** • No surface structures, materials, or waste were observed within the Sump Area during the site visit.	• Not applicable for this parameter.	**Wellsite Area:** • Assess the condition of the coarse woody debris in the wallows and add more debris or carry out maintenance, if required. • Assess the condition of the two remote cameras and carry out maintenance as required, replace batteries, and download stored photos. Keep cameras in place to continue monitoring the wallows and surroundings. Secure cameras so they are not dislodged by wildlife. • No further work related to on-site materials recommended until the wellhead is cut, capped, and abandoned. **Sump Area:** • No actions related to on-site materials are recommended at this time.

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Parameters	Monitoring Observations and Results	Soil and Water Analytical Results (if exceedances)	Future Recommended Work
Terrain	**Wellsite Area:** • Overall, the Site appeared stable with no new signs of stress, erosion, or instability. **Sump Area:** • No changes in the overall sump topography were noted during the 2023 site visit. The western portion of the sump was raised approximately 1 m above the surrounding ground surface, while the northeastern portion was marked by a shallow depression. At the time of the 2023 site visit, a very small volume of standing water was present in the depression (Attachment B: Photo B.3 and Photo B.5). • The previously observed tension crack marking the length of the raised portion of the sump cap appeared stable. Vegetation was observed to have colonized all previous bare ground and no visible indicators that recent movement had occurred were noted (Attachment B: Photo B.5).	• Not applicable for this parameter.	**Wellsite Area:** • Continued visual monitoring for potential signs of stress and/or ground movement. **Sump Area:** • Continued visual monitoring for potential signs of stress and/or ground movement.
Standing Water	**Wellsite Area:** • No standing water was observed or sampled in the Wellsite Area during the site visit.	**Wellsite Area:** • Water samples were not collected in this area during the 2023 site visit.	**Wellsite Area:** • Collect standing water samples from on-site locations, if present, to establish water quality trends. Samples to be submitted for routine chemistry and petroleum hydrocarbons (PHC).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Parameters	Monitoring Observations and Results	Soil and Water Analytical Results (if exceedances)	Future Recommended Work
Standing Water (cont'd)	**Sump Area:** • A small volume of standing water was present in the sump depression at the time of the site visit; standing water was not sampled in the Sump area in 2023 (Attachment B: Photo B.3 and Photo B.5). • Previous sample data (2014-2019) correlates with the 2018 Electromagnetic (EM) survey and suggests some influence from the buried drilling waste extending north, northeast, and southeast of the sump cell[4].	**Sump Area:** • Water samples were not collected in this area during the 2023 site visit.	**Sump Area** • Collect standing water samples from the Sump Area, if present, to establish water quality trends. Samples to be submitted for routine chemistry and total metals. • Collect one to three standing water samples from upgradient and off-site locations from the Sump Area to update referenced background chemistry for routine chemistry and total metal parameters.
Soils	**Wellsite Area:** • Historical soil sample data (2013-2019) from the Wellsite Area reported soil matrix imbalances (elevated electrical conductivity [EC] and sodium adsorption ratio [SAR] rating from high concentrations of sulfate, chloride, and sodium) when compared with reference soil data. Soil imbalance is likely indicative of wildlife impacts (likely from muskox, caribou, and moose). • Historical soil sample data (2016-2022) from the wallows has also reported PHC fraction 2 and 3 (F2 and F3) exceedances when compared with the referenced guidelines. Biogenic sourced PHCs are suspected to be contributing to the concentrations in some of the samples collected from the WC Wallow (SS18-01, SS18-03, and SS22-01). However, PHC exceedances were suspected to be petrogenic based on results from K14-SS18-02 also collected from the WC Wallow[5]	**Wellsite Area:** • SS23-04 samples from 0-0.25 m and 0.25-0.5 m as well as SS23-05 sample from 0.25-0.5 m reported EC values that exceeded the applied guideline of 2 deciSiemens per meter (dS/m). • The conductivity exceedances result in a soil quality rating of "Fair" to "Poor" for soil EC rating.	**Wellsite Area:** • Collect additional soil samples for PHC, PHC F3a/b fractionation, and detailed salinity analysis from the WC Wallow at K14-SS18-02 to confirm PHC concentrations and F3a/b fractionation to determine if PHC concentrations are petrogenic and if further remedial work is required during abandonment of the well. • Collect soil samples from off-site wallows, if observed, for PHC, PHC F3a/b, and detailed salinity analysis to establish reference wallow soil chemistry.

[4] Kālo Stantec, 2019. MGM Energy - 2019 Environmental Site Monitoring Report Site: Nogha K-14 Wellsite and Sump. Prepared for MGM Energy Corporation, Calgary, Alberta. November 2019. File No. 123513162.
[5] Kālo Stantec, 2018. MGM Energy - 2018 Environmental Site Monitoring Report Site: Nogha K-14 Wellsite and Sump. Prepared for MGM Energy Corporation, Calgary, Alberta. November 2018.

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Parameters	Monitoring Observations and Results	Soil and Water Analytical Results (if exceedances)	Future Recommended Work
Soils (cont'd)	• An electric magnetic (EM) survey conducted in 2022 reported elevated apparent conductivity extending south from the sump and along the southern portion of the wellsite[6]. Further sampling and data trending were recommended to confirm the source for the elevated apparent conductivity and inorganics (i.e., naturally occurring or associated with the sump material). • A total of 12 soil samples from six sample locations (SS23-01 to SS23-06) were collected during the 2023 site visit. The soil samples were collected from locations extending south of the sump cell and along the southern portion of the wellsite area where elevated apparent conductivity was reported in 2022[6]. **Sump Area:** • Historical soil sample data (2017-2022) from the sump area has reported elevated EC likely due to high sulphate and inorganic concentrations when compared with reference chemistry data (Attachment C, Table C.1, Table C.2, and Table C.3). Based on Site records, no salt-based drilling muds were disposed of in the on-site Sump. As a result, the elevated inorganics are likely attributed to naturally occurring conditions (i.e., high moisture and organics/peat). • Further sampling and data trending were recommended to confirm the source for the elevated apparent conductivity and inorganics (i.e., naturally occurring or associated with the sump material).	• Elevated concentrations of calcium, magnesium, and sulphate were reported at the locations with conductivity exceedances when compared with the referenced soil chemistry (Attachment C: Table C.1 through Table C.3). • Based on Site records which indicate that only surface hole cuttings and water-based fluid were disposed in the on-site sump[7], and the high moisture and organic content of the soil within the southern portion of the wellsite, the elevated inorganic concentrations may be attributed to naturally occurring conditions (i.e., high moisture and organics/peat) and not associated with former site operations or the sump.	**Sump Area:** • Collect soil samples from the Sump Area to guide reclamation activities and monitor soil chemistry where required to support vegetation establishment.

[6] K'alo Stantec, 2023. MGM Energy - 2022 Environmental Site Monitoring Report Site: Nogha K-14 Wellsite and Sump. Prepared for MGM Energy Corporation, Calgary, Alberta. May 2023.
[7] MGM Energy Corp. 2012. Re: Apache Canada Ltd. – 2012 Summer Inspection / Abandonment and Restoration Reporting for Water License S03L1-016 Nogha K-14 Lease, Drilling Sump & Campsite.

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Parameters	Monitoring Observations and Results	Soil and Water Analytical Results (if exceedances)	Future Recommended Work
Vegetation	**Wellsite Area** (Attachment A: Figure A.3): • Wellsite Area had naturally revegetated with trees, shrubs, and forbs (Attachment B: Photo B.12 to Photo B.15). • Vegetation cover in the majority of the Wellsite Area met land use permit requirements for >70% vegetation cover, and in healthy condition, including the WC Wallow and Wallows 1, 2 and 5. • The WC Wallow and Wallows 1 to 5 underwent reclamation treatments in 2019 to increase vegetation cover. Vegetation has re-established in the WC Wallow and Wallows 1, 2, and 5. Wallows 3 and 4 were not assessed during the 2023 site visit. *Well Centre Wallow:* • Vegetation was well established in the area. Total vegetation cover was approximately 80% to 85%, consisting of 70% to 75% cover for seeded native grasses and 10% for naturally established forbs and shrubs (Attachment B: Photo B.16). • Vegetation cover met permit requirements (i.e., >70% cover and healthy condition). • Vegetation did not appear to be grazed (0% of plants grazed) and ground did not appear impacted by ungulate hoof traffic. *Wallow 1:* • Vegetation was well established in the area. Total vegetation cover was approximately 80% to 85%, consisting of 75% to 80% cover for seeded native grasses and 5% for naturally established shrubs and forbs (Attachment B: Photo B.17). • Vegetation cover met permit requirements (i.e., >70% cover and healthy condition). • Vegetation did not appear to be grazed (0% of plants grazed) and ground did not appear impacted by ungulate hoof traffic.	• Not applicable for this parameter.	**Wellsite Area:** • Carry out reconnaissance level vegetation monitoring in the Wellsite Area, including the WC Wallow and Wallows 1 to 5. • Carry out detailed vegetation monitoring at the proposed standing water and soil sampling locations. • Reconnaissance level monitoring for invasive plants whenever a site visit is carried out, particularly at the wallows. – Carry out invasive plant/weed control treatments if infestations reach a density that prohibits vegetation establishment and growth, including pulling plants, storing in garbage bags, and disposing off-site at an approved facility. **Sump Area:** • Carry out reconnaissance level vegetation monitoring on the overall Sump Area, including the Drilling Sump Bare Area. • Carry out detailed vegetation monitoring at the proposed standing water and soil sampling locations.

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Parameters	Monitoring Observations and Results	Soil and Water Analytical Results (if exceedances)	Future Recommended Work
Vegetation (cont'd)	*Wallow 2:* • Vegetation was well established in the area. Total vegetation cover was approximately 90% to 95%, consisting of 85% to 90% cover for seeded native grasses and 5% for naturally established shrubs and forbs (Attachment B: Photo B.18). • Vegetation cover met permit requirements (i.e., >70% cover and healthy condition). • Vegetation did not appear to be grazed (0% of plants grazed) and ground did not appear impacted by ungulate hoof traffic. *Wallow 5:* • Vegetation was well established in the area. Total vegetation cover was approximately 70% to 75% cover, consisting of naturally established shrubs, mosses, and lichens (Attachment B: Photo B.19). • Vegetation cover met permit requirements (i.e., >70% cover and healthy condition). • Vegetation did not appear to be grazed (0% of plants grazed) and ground did not appear impacted by ungulate hoof traffic. • No invasive plants/weeds observed within the Wellsite Area during the 2023 site visit. **Sump Area** (Attachment A: Figure A.3): • Vegetation cover and health observed on the Sump Area met land use permit requirements (i.e., >70% vegetation cover and in healthy condition) (Attachment B: Photo B.20 and Photo B.21)	• Not applicable for this parameter.	• Reconnaissance level monitoring for invasive plants whenever a site visit is carried out, particularly at the Drilling Sump Bare Area. – Carry out invasive plant/weed control treatments if infestations reach a density that prohibits vegetation establishment and growth, including pulling plants, storing in garbage bags, and disposing off-site at an approved facility.

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Parameters	Monitoring Observations and Results	Soil and Water Analytical Results (if exceedances)	Future Recommended Work
Vegetation (cont'd)	*Drilling Sump Bare Area:* • At the time of the 2023 site visit, only a small volume of standing water was present in the sump depression, which allowed grasses to establish in the portions of bare ground previously covered by standing water. • Vegetation was well established in the area surrounding the bare ground. Total vegetation cover was approximately 70% to 75%, consisting of 5% cover for seeded grasses and 65% to 70% for naturally established sedges, shrubs, and trees (Attachment B: Photo B.20 and Photo B.21). • Vegetation cover met permit requirements (i.e., >70% cover and healthy condition). • Vegetation did not appear to be grazed (0% of plants grazed), but the bare ground did have minor evidence of hoof traffic. • No invasive plants/weeds were observed within the Sump Area during the 2023 site visit.	• Not applicable for this parameter.	*see above*
Wildlife Signs	**Wellsite Area:** • Photos taken by the remote cameras located adjacent to Wallow 1 and the WC Wallow indicated use by moose (*Alces alces)*, ptarmigan (*Lagopus spp.*), muskox (*Ovibos moschatus*), marten (*Martes americana*), and black bear (*Ursus americanus)* from August 2022 to June 2023 (Attachment B: Photo B.22 and Photo B.23). • The WC Wallow, and Wallows 1, 2 and 5 did not appear impacted by wildlife use at the time of the site visit. • The wood debris covering the wallows may have discouraged ungulate use. • No other wildlife signs of use were observed within the Wellsite Area during the site visit.	• Not applicable for this parameter.	**Wellsite Area:** • Continue monitoring for wildlife use at the Site, particularly at the wallows. • Monitor effectiveness of placing coarse woody debris on the wallows to exclude ungulates from accessing the seeded area. • Monitor any naturally occurring wallows observed off-site. • Continue use of remote cameras near the WC Wallow and Wallows 1 and 2 to monitor muskox and other wildlife presence and use of the wallows.

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Parameters	Monitoring Observations and Results	Soil and Water Analytical Results (if exceedances)	Future Recommended Work
Wildlife Signs (cont'd)	**Sump Area:** • Ungulate hoof prints were observed in the muddy ground of the Drilling Sump Bare Area. • No other wildlife signs of use observed within the Sump Area during the site visit	• Not applicable for this parameter.	**Sump Area:** • Continue monitoring for wildlife use at the Site.

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

2 Limitations and Closure

This document entitled 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area was prepared by K'alo-Stantec Ltd. ("K'alo-Stantec") for the account of MGM Energy (the "Client") to support the regulatory review process for its Annual Site Monitoring Report (the "Report") for the: Nogha K-14 Wellsite Area and Sump Area (the "Project"). In connection therewith, this document may be reviewed and used by the Government of Northwest Territories participating in the review process in the normal course of its duties. Except as set forth in the previous sentence, any reliance on this document by any other party or use of it for any other purpose is strictly prohibited. The material in it reflects K'alo-Stantec's professional judgment in light of the limited scope, schedule and other limitations stated in the document and in the contract between K'alo-Stantec and the Client. The information and conclusions in the document are based on the conditions existing at the time the document was published and does not take into account any subsequent changes. In preparing the document, K'alo-Stantec did not verify information supplied to it by the Client or others, unless expressly stated otherwise in the document. Any uses which another party makes of this document is the responsibility and risk of such party. Such party agrees that K'alo-Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other party as a result of decisions made or actions taken based on this document.

K'alo-Stantec Ltd.

Tamara Tiessen, M.Sc.
Environmental Scientist

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Date: 2024.01.22 17:26:04 -05'00'

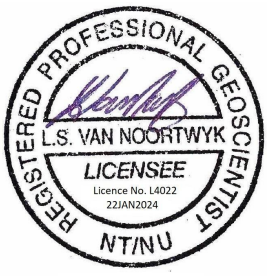
Olivier Piraux, M.Sc.
Terrain Scientist

Borges, Lionel
Digitally signed by Borges, Lionel
Date: 2024.01.22 09:52:58 -08'00'

Lionel Borges, B.Sc.
Senior Biologist / Reclamation Specialist

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

This report was reviewed and approved for transmittal by:



Lindsay van Noortwyk, P.Geo.
Environmental Geoscientist

David Alberti M.Sc., P.Geol., MBA
Principal Hydrogeologist

Attachments:

Attachment A: Figures

- Figure A.1 MGM Energy Wellsite, Sump, and Staging Area Locations within the Sahtu Settlement Area
- Figure A.2 Nogha K-14 Wellsite Area and Sump Area – Soil and Water Sample Locations
- Figure A.3 Nogha K-14 Wellsite Area and Sump Area – Reclamation Assessment

Attachment B: Site Photographs

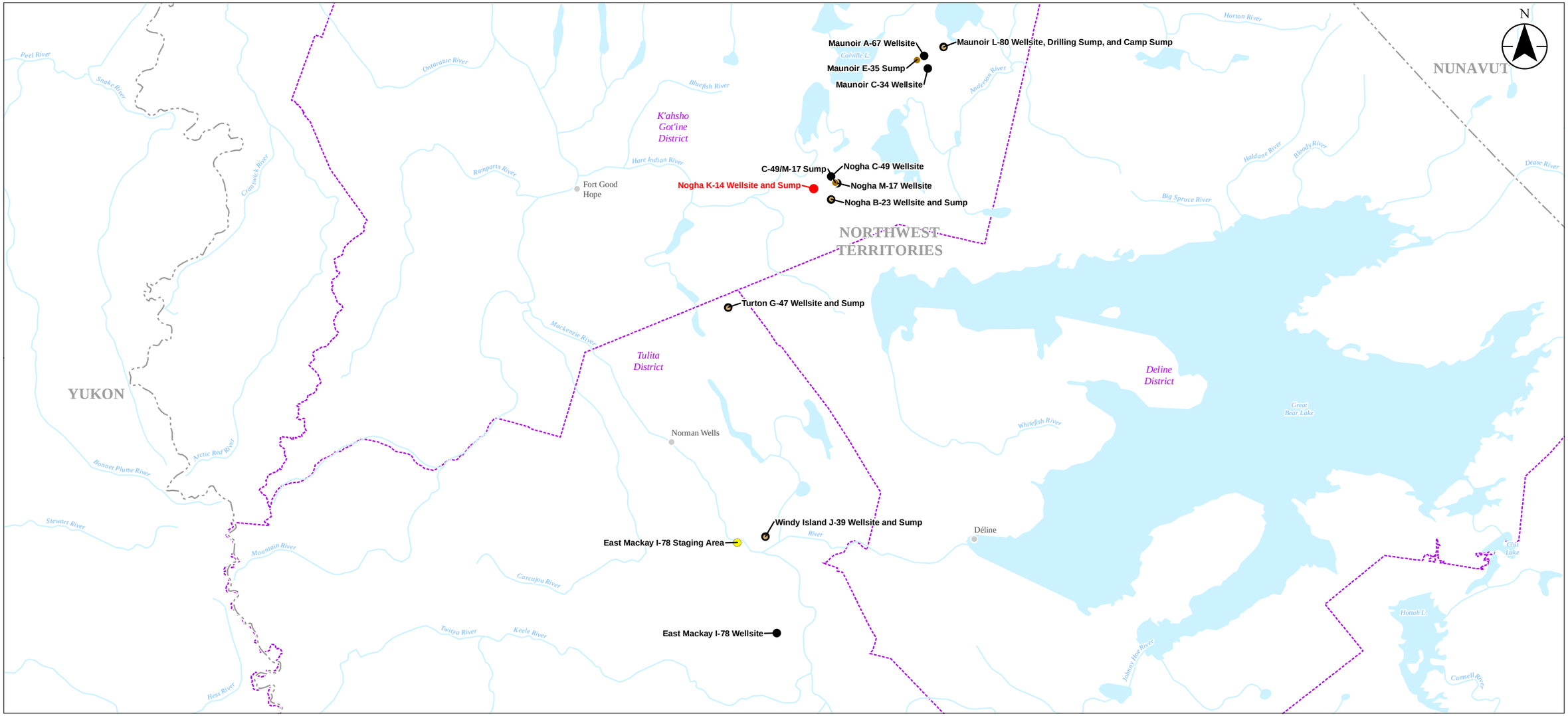
Attachment C: Tables

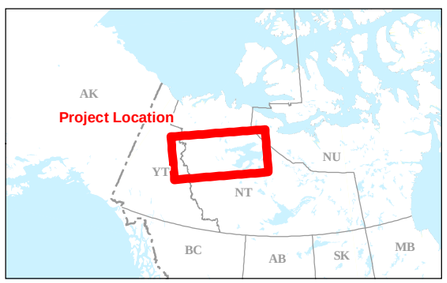
- Table C.1 Summary of Soil Analytical Results: Reference Samples and Statistical Calculations, Mineral Soils
- Table C.2 Summary of Soil Analytical Results: Reference Samples and Statistical Calculations, Organic Soils
- Table C.3 Summary of Soil Analytical Results

Attachment D: Laboratory Report

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Attachment A Figures





- Report Location
- Staging Area
- Sump
- Wellsite
- Wellsite and Sump
- District Boundary

0 25 50 kilometers
(At original document size of 11x17)
1:2,000,000

Kilo-Stantec

Project Location	Prepared by NFORRESTER on 20231122
Sahtu Settlement Area	QR by LVANNOORTWYK on 20231217
NT	IR by DALBERTI on 20231218
Client/Project	123514551

Client: MGM Energy
Project: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Figure No.
A.1

Title
MGM Energy Wellsite, Sump, and Staging Area Locations within the Sahtu Settlement Area

Notes
1. Coordinate System: NAD 1983 NWT Lambert
2. Data Sources: Base Data - Natural Earth. Thematic Data - KAVIK-STANTEC Inc., Government of Northwest Territories

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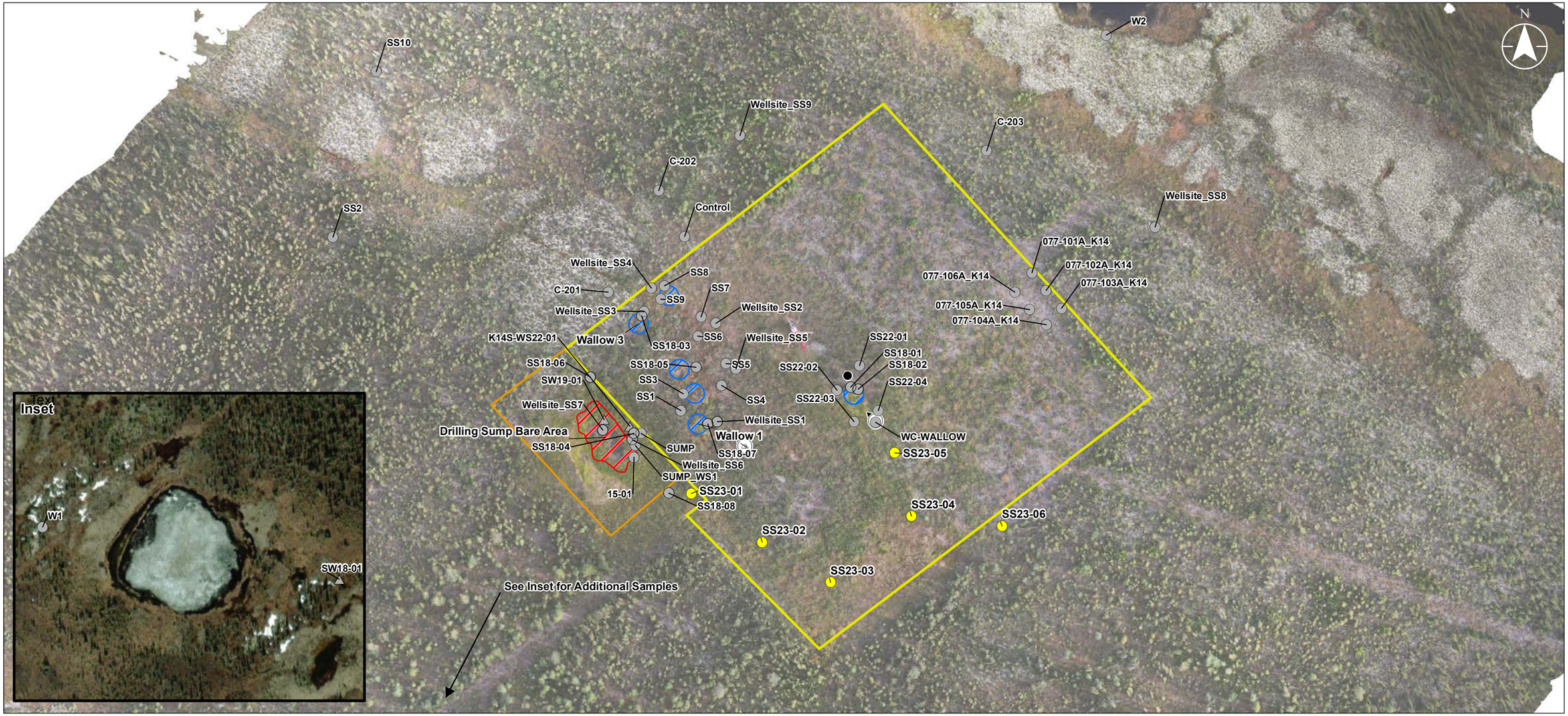

- 2023 Soil Sample
- Historical Soil Sample
- Historical Water Sample
- Camera
- Wellhead
- Further Treatment Required
- Sump Area
- Wallow
- Wellsite Area

0 25 50 metres

(At original document size of 11x17)
1:1,200

Notes
1. Coordinate System: NAD 1983 UTM Zone 8N
2. Data Sources: Base Data - Natural Earth. Thematic Data - KAVIK-STANTEC Inc., Government of Northwest Territories
3. GPS coordinates for sampling locations were recorded in the field by an iPad collector tool. Accuracy of GPS coordinates may vary plus or minus 5 metres
4. Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

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Project Location
Sahtu Settlement Area
NT

Prepared by NFORRESTER on 20231122
QR by LVANNOORTWYK on 20231217
IR by DALBERTI on 20231218

Client/Project 123514551
Client: MGM Energy
Project: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Figure No.
A.2

Title
Nogha K-14 Wellsite Area and Sump Area – Soil and Water Sample Locations

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Camera
Wellhead
Further Treatment Required
Natural revegetation with native tree, shrub and forb species that meets land use permit requirements
Revegetation with seeded agronomic and native grass species that meets land use permit requirements
Revegetation with seeded native grass species that meets land use permit requirements
Sump Area
Wallow
Wellsite Area

0 25 50 metres
(At original document size of 11x17)
1:1,200

Notes
1. Coordinate System: NAD 1983 UTM Zone 8N
2. Data Sources: Base Data - Natural Earth. Thematic Data - KAVIK-STANTEC Inc., Government of Northwest Territories
3. GPS coordinates for sampling locations were recorded in the field by an iPad collector tool. Accuracy of GPS coordinates may vary plus or minus 5 metres
4. Service Layer Credits:

Kálo-Stantec

Project Location
Sahtu Settlement Area
NT

Prepared by NFORRESTER on 20231122
QR by LVANNOORTWYK on 20231217
IR by DALBERTI on 20231218

Client/Project 123514551
Client: MGM Energy
Project: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Figure No.
A.3

Title
Nogha K-14 Wellsite Area and Sump Area – Reclamation Assessment

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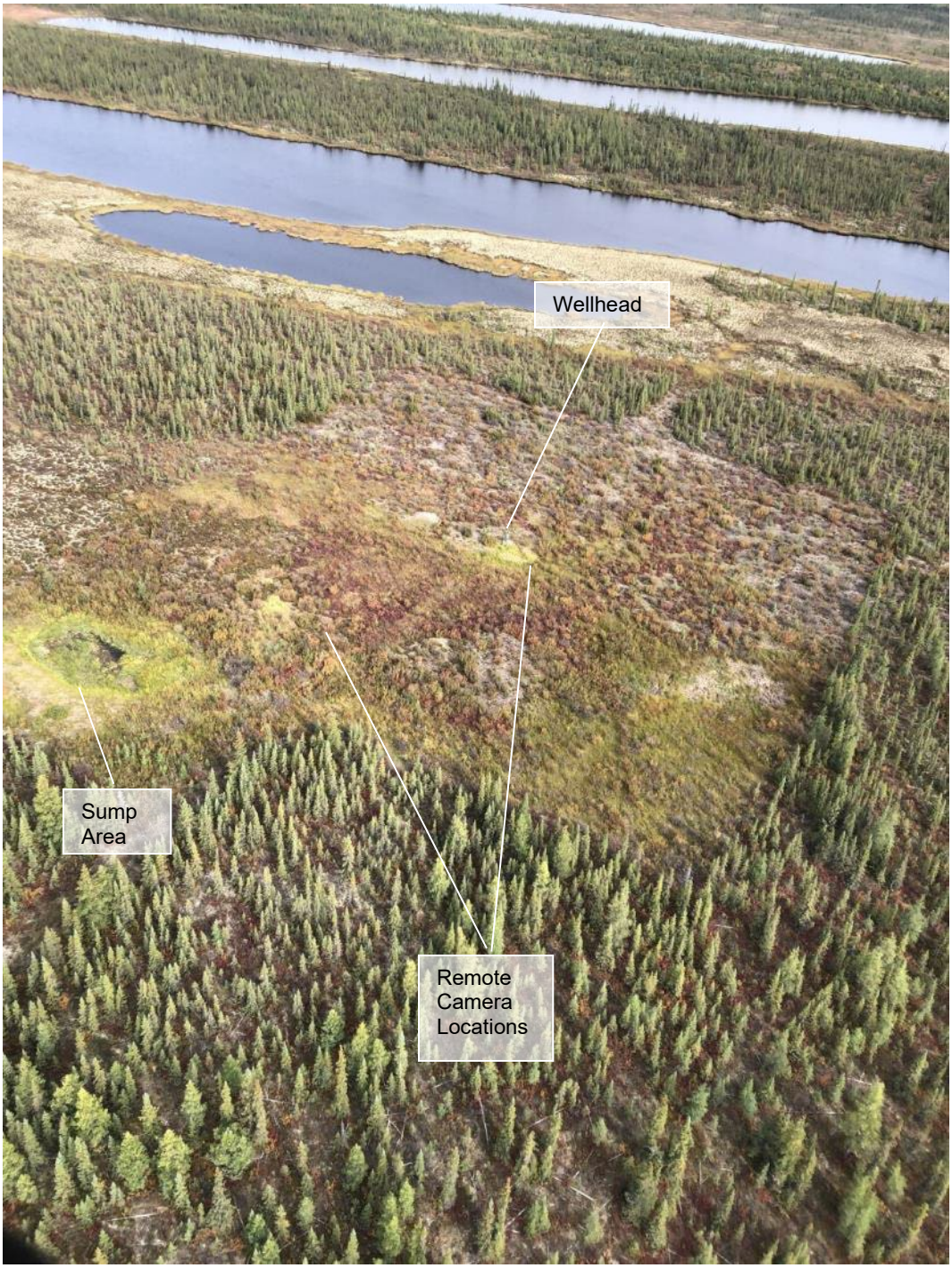
Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Attachment B Site Photographs

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.1 K-14 Wellsite Area and Sump Area: Overview



Note: North facing aerial view showing the Wellsite Area, Sump Area, Wellhead, and Remote Camera Locations (August 30, 2023).

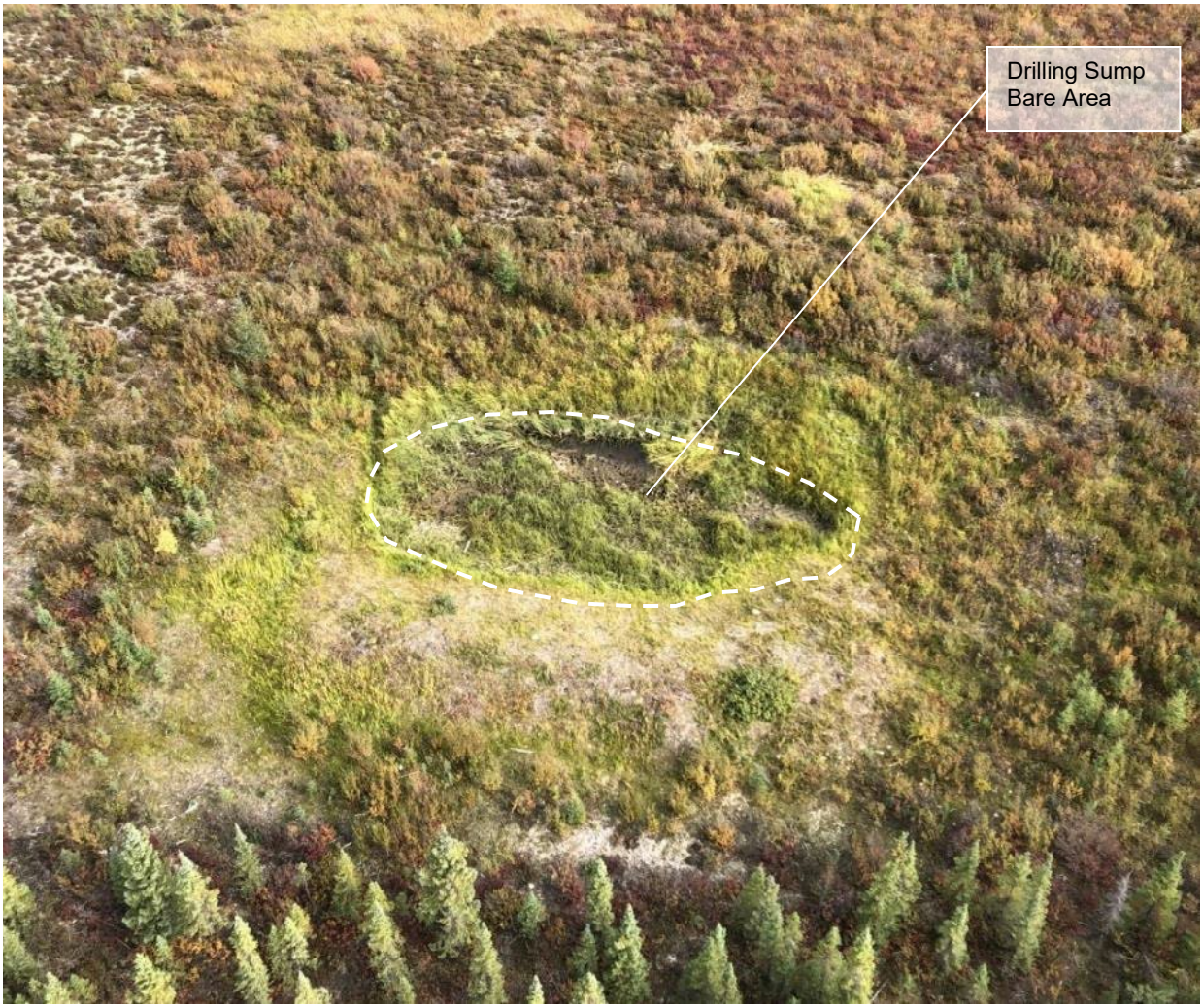
Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.2 K-14 Wellsite Area and Sump Area: Wellsite Area Close-up View

Note: Northeast facing aerial view of the Wellsite Area showing typical ground and vegetation cover conditions (August 30, 2023).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.3 K-14 Wellsite Area and Sump Area: Sump Area Close-up View



Note: Northeast facing aerial view of the Sump Area showing the location of the Drilling Sump Bare Area, sump surface conditions, and vegetation cover conditions (August 30, 2023).

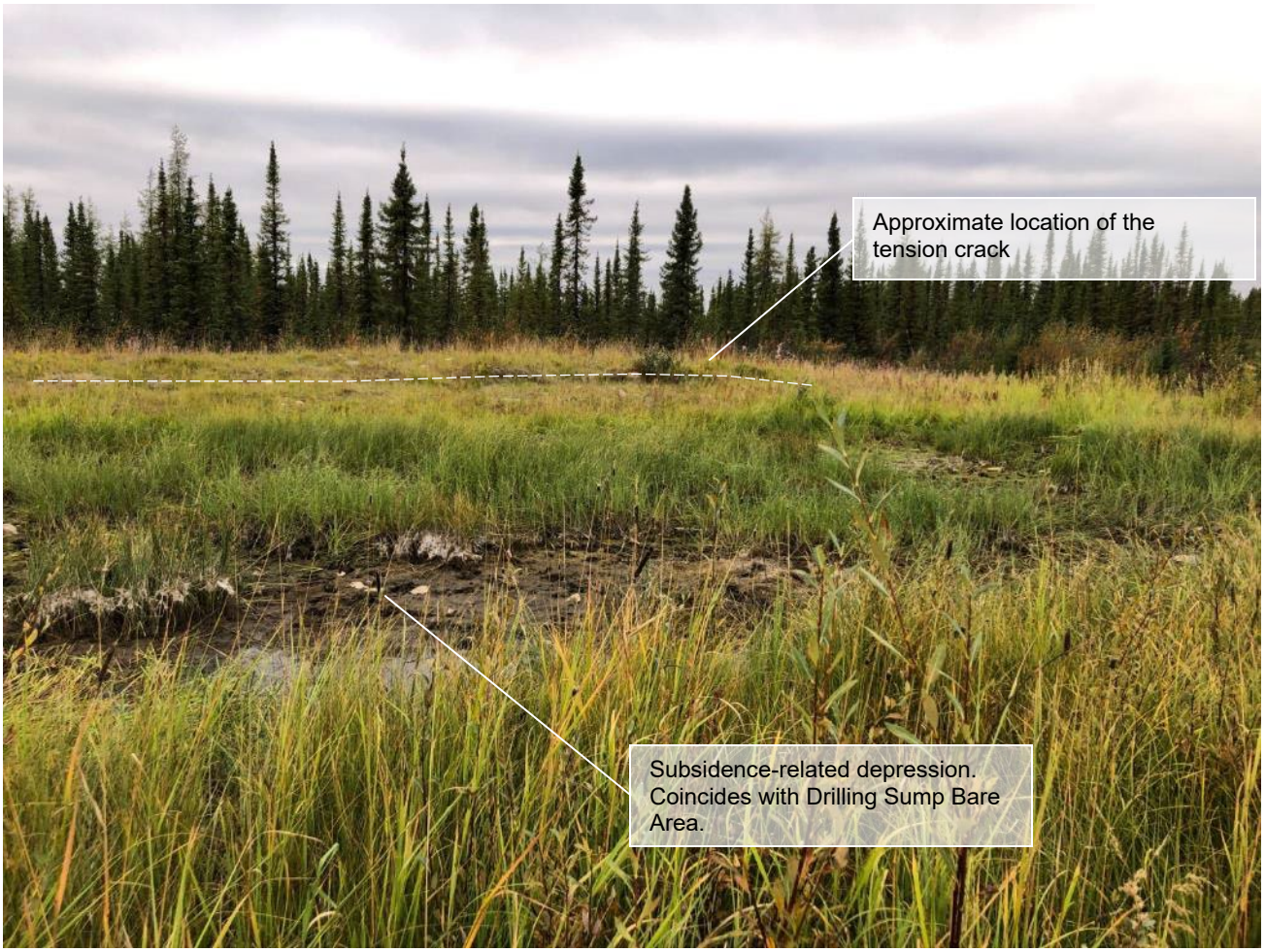
Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.4 K-14 Wellsite Area and Sump Area: On-Site Materials

Note: Northwest facing view of on-site materials showing wellhead, sign, protective culvert, and grating cover (August 30, 2023).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.5 K-14 Wellsite Area and Sump Area: Terrain - Sump Area Conditions



Note: West facing view of Sump Area. No changes observed in the overall sump topography as part of the 2023 site visit (August 30, 2023). The western portion of sump was observed to be raised approximately 1 m above the surrounding ground surface, while the eastern portion was subsided, allowing for the accumulation of standing water (very small volume present during the August 30, 2023 visit). The previously observed tension crack was not readily visible due to the presence of a healthy vegetation cover.

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.6 K-14 Wellsite Area and Sump Area: Soil Sampling Location - K14-SS23-01

Note: View of soil sampling location K14-SS23-01 (August 30, 2023).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.7 K-14 Wellsite Area and Sump Area: Soil Sampling Location - K14-SS23-02

Note: View of soil sampling location K14-SS23-02 in the vicinity of the Wellhead (August 30, 2023).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.8 K-14 Wellsite Area and Sump Area: Soil Sampling Location - K14-SS23-03

Note: View of soil sampling location K14-SS23-03 (August 30, 2023).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.9 K-14 Wellsite Area and Sump Area: Soil Sampling Location - K14-SS23-04

Note: View of soil sampling location K14-SS23-04 (August 30, 2023).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.10 K-14 Wellsite Area and Sump Area: Soil Sampling Location - K14-SS23-05

Note: View of soil sampling location K14-SS23-05 (August 30, 2023).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.11 K-14 Wellsite Area and Sump Area: Soil Sampling Location - K14-SS23-06

Note: View of soil sampling location K14-SS23-06 (August 30, 2023).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.12 K-14 Wellsite Area and Sump Area: Vegetation Cover - Wellsite Area

Note: Northwest facing view of ground and vegetation conditions in the Wellsite Area. Wellsite Area was undisturbed and the majority of the Site has revegetated with naturally established trees, shrubs, and forbs. Vegetation cover was observed to be meeting permit requirements (i.e., >70% cover and healthy condition) (August 30, 2023).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.13 K-14 Wellsite Area and Sump Area: Vegetation Cover - Wellsite Area

Note: Southwest facing view of ground and vegetation conditions in the Wellsite Area. Wellsite Area was undisturbed and the majority of the Site has revegetated with naturally established trees, shrubs, and forbs. Vegetation cover was observed to be meeting permit requirements (i.e., >70% cover and healthy condition) (August 30, 2023).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.14 K-14 Wellsite Area and Sump Area: Vegetation Cover - Wellsite Area

Note: Southeast facing view of ground and vegetation conditions in the Wellsite Area. Wellsite Area was undisturbed and the majority of the Site has revegetated with naturally established trees, shrubs, and forbs. Vegetation cover was observed to be meeting permit requirements (i.e., >70% cover and healthy condition) (August 30, 2023).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.15 K-14 Wellsite Area and Sump Area: Vegetation Cover - Wellsite Area

Note: Northwest facing view of ground and vegetation conditions in the Wellsite Area. Wellsite Area was undisturbed and the majority of the Site has revegetated with naturally established trees, shrubs, and forbs. Vegetation cover was meeting permit requirements (i.e., >70% cover and healthy condition) (August 30, 2023).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.16 K-14 Wellsite Area and Sump Area: Vegetation Cover- Well Centre Wallow

Note: North facing view of Well Centre Wallow showing ground and vegetation conditions. Area underwent reclamation treatments and was covered with wood debris in July 2019. Vegetation had re-established and did not appear grazed by ungulates, and the ground did not appear impacted by ungulate hoof traffic. Wood debris was still in place. Vegetation cover was approximately 80% to 85% cover, appeared healthy, and was meeting permit requirements (i.e., >70% cover and healthy condition) (August 30, 2023).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.17 K-14 Wellsite Area and Sump Area: Vegetation Cover - Wallow 1

Note: Northeast facing view of Wallow 1 showing ground and vegetation conditions. Area underwent reclamation treatments and was covered with wood debris in July 2019. Vegetation had re-established and did not appear to be grazed by ungulates, and the ground did not appear impacted by ungulate hoof traffic. Wood debris was still in place. Vegetation cover was approximately 80% to 85% cover, appeared healthy, and was meeting permit requirements (i.e., >70% cover and healthy condition) (August 30, 2023).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.18 K-14 Wellsite Area and Sump Area: Vegetation Cover - Wallow 2

Note: Northwest facing view of Wallow 2 showing ground and vegetation conditions. Area underwent reclamation treatments and was covered with wood debris in July 2019. Vegetation had re-established and did not appear to be grazed by ungulates, and the ground did not appear impacted by ungulate hoof traffic. Wood debris was still in place. Vegetation cover was approximately 90% to 95% cover, appeared healthy, and was meeting permit requirements (i.e., >70% cover and healthy condition) (August 30, 2023).

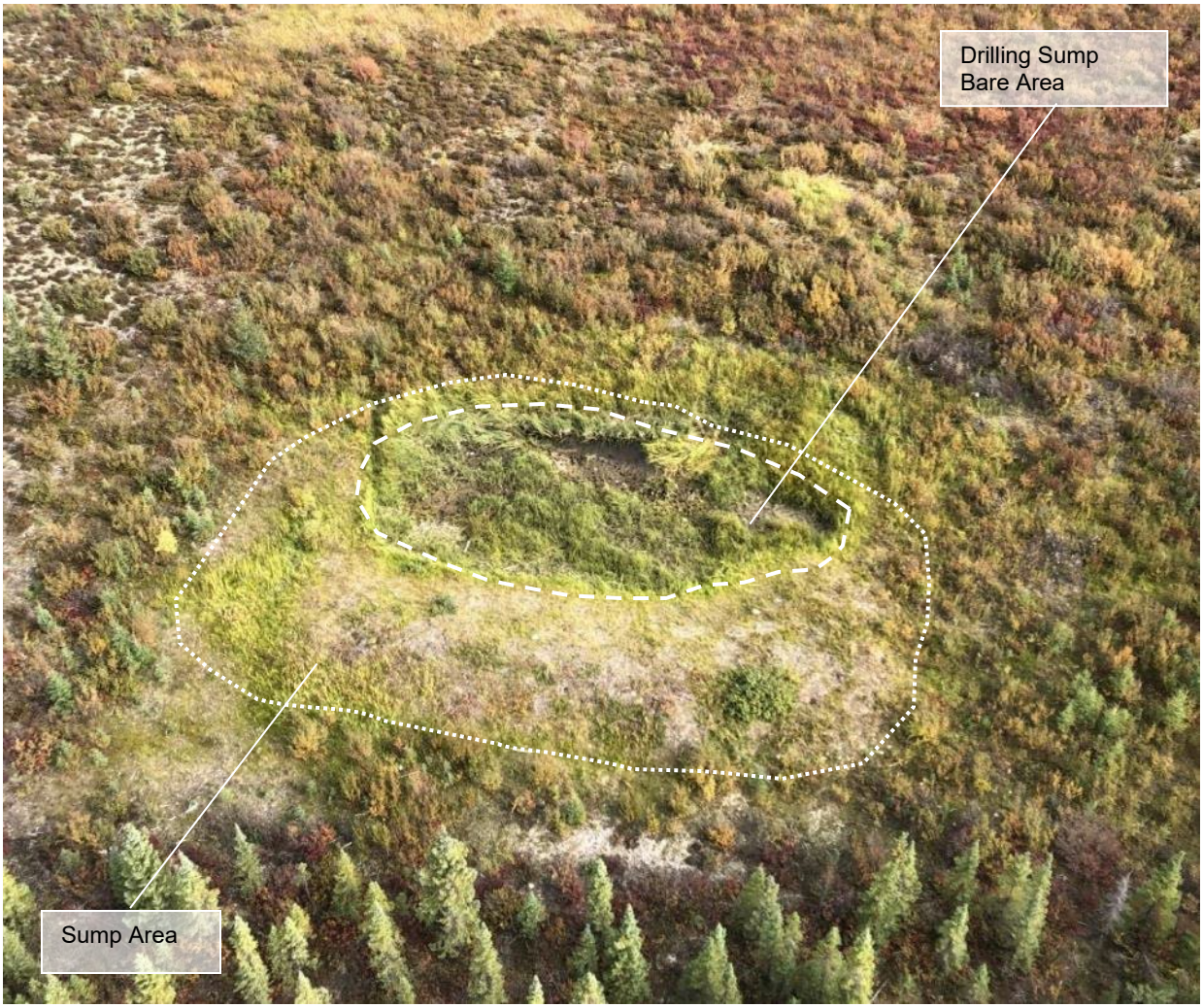
Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.19 K-14 Wellsite Area and Sump Area: Vegetation Cover - Wallow 5

Note: West facing view of Wallow 5 showing ground and vegetation conditions. Area underwent fertilizer application in July 2019 to enhance growth of naturally established native vegetation. Vegetation had reestablished and did not appear to be grazed by ungulates, and the ground did not appear impacted by ungulate hoof traffic. Vegetation cover was approximately 70% to 75% cover, appeared healthy, and was meeting permit requirements (i.e., >70% cover and healthy condition) (August 30, 2023).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.20 K-14 Wellsite Area and Sump Area: Vegetation Cover - Sump Area



Note: Northeast facing view of ground and vegetation conditions on the Sump Area. Sump Area was revegetated with seeded grasses, and naturally established shrubs, and forbs. Vegetation cover met permit requirements (i.e., >70% cover and healthy condition). Drilling Sump Bare Area had cover consisting of seeded grasses, and naturally established sedges. Vegetation cover was approximately 70% to 75% cover, appeared healthy, and met permit requirements, at the time of the 2023 site visit (i.e., >70% cover and healthy condition) (August 30, 2023).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.21 K-14 Wellsite Area and Sump Area: Vegetation Cover - Sump Area

Note: West facing view of ground and vegetation conditions on the Sump Area and Drilling Sump Bare Area. Sump Area revegetated with seeded grasses, and naturally established shrubs, and forbs. Vegetation cover met permit requirements (>70% cover, healthy conditions). Drilling Sump Bare Area had cover consisting of seeded grasses, and naturally established sedges. Vegetation cover was approximately 70% to 75% cover, appeared healthy, and met permit requirements, at the time of the 2023 site visit (i.e., >70% cover and healthy condition) (August 30, 2023).

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.22 K-14 Wellsite Area and Sump Area: Wildlife Signs - Remote Camera Facing Wallow 1

a) Black bear

b) Muskox

c) Moose

d) Ptarmigan

e) Marten

f) Black bears fighting

Note: Views of wildlife in vicinity of Wallow 1 (August 2022 – June 2023). On June 19, 2023, two black bears fighting next to the camera location knocked the camera out of position and no useful photos were taken for the remainder of 2023.

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Photo B.23 K-14 Wellsite Area and Sump Area: Wildlife Signs- Remote Camera Facing Well Centre Wallow and Wellhead

a) Black bear

b) Muskox

c) Ptarmigan

Note: Views of wildlife in vicinity of Well Centre Wallow (August 2022 – May 2023). On May 8, 2023, an animal knocked the camera out of position and no useful photos were collected for the remainder of 2023.

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Attachment C Tables

Table C.1
Summary of Soil Sample Analytical Results: Reference Samples and Statistical Calculations, Mineral Soils
Nogha K-14 Wellsite and Sump
MGM Energy Corporation

			K-14																								
			Reference Sample (mineral soil)																								
Sample Location			Control	C-202	C-203		Wellsite_SS9																				
Sample Date			15-Jul-12	20-Jul-13	20-Jul-13	20-Jul-13	20-Jul-17																				
Sample ID			Control 40-70	C-202 @ 36-48cm	C-203 @ 10-55cm	C-203 @ 55-103cm	K14_Wellsite_SS9_0.0-0.25																				
Sample Depth			0.4 - 0.7 m	0.36 - 0.48 m	0.1 - 0.55 m	0.55 - 1.03 m	0 - 0.25 m																				
Sampling Company			PRDDIS	PRDDIS	PRDDIS	PRDDIS	STANTEC																				
Laboratory		NWT	AGAT	AGAT	AGAT	AGAT	MAXX																				
Laboratory Work Order		Table A.7	12E621623	13E740243	13E740243	13E740243	B761155																				
Laboratory Sample ID	**Units**	A	3529398	4586040	4586042	4586043	R07253																				
								Minimum	Maximum	Mean	Median	5th	25th	75th	90th	95th	Std. Dev.	Std. Err.	Geo. Mean	Count	Detect	ND	Exceed
Physical Properties																											
Percent Sand	%	n/v	-	-	-	-	42	42	42	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	1	0	0
Percent Silt	%	n/v	-	-	-	-	28	28	28	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	1	0	0
Percent Clay	%	n/v	-	-	-	-	30	30	30	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	1	0	0
Texture	none	n/v	-	-	-	-	CLAYLOAM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sieve - Pan	%	n/v	-	-	-	-	48	48	48	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	1	0	0
Sieve - #200 (>0.075mm)	%	n/v	48	49	47	48	52	47	52	48.8	48	47.2	48	49	50.8	51.4	1.9	0.9	48.8	5	5	0	0
Grain Size	none	n/v	Fine	Fine	Fine	Fine	COARSE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General Chemistry																											
Calcium	mg/kg	n/v	30	66	15	8	28	8	66	29.4	28	9.4	15	30	51.6	58.8	22.4	10	23.2	5	5	0	0
Calcium	mg/L	n/v	72	82	37	26	56	26	82	54.6	56	28.2	37	72	78	80	23.4	10.4	50.2	5	5	0	0
Cation/EC Ratio	none	n/v	-	-	-	-	12	12	12	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	1	0	0
Chloride	mg/kg	n/v	2	7	3	3	<2.5	2	7	3.5	3	2.1	2.5	3	5.4	6.2	2	0.9	3.2	5	4	1	0
Chloride	mg/L	n/v	5	9	8	8	<5.0	5	9	7	8	5	5	8	8.6	8.8	1.9	0.8	6.8	5	4	1	0
Conductivity in Saturated Paste	dS/m	2	0.63	0.81	**2.73**[A]	0.29	-	0.29	2.77	1.12	0.72	0.34	0.54	1.3	2.18	2.48	1.12	0.56	0.8	4	4	0	1
Ion Balance	none	n/v	-	-	-	-	2.0	2	2	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	1	0	0
Magnesium	mg/kg	n/v	15	36	6	4	13	4	36	14.8	13	4.4	6	15	27.6	31.8	12.7	5.7	11.1	5	5	0	0
Magnesium	mg/L	n/v	35	45	16	12	25	12	45	26.6	25	12.8	16	35	41	43	13.6	6.1	23.8	5	5	0	0
Moisture Content	%	n/v	19	48	15	14	26	14	48	24.4	19	14.2	15	26	39.2	43.6	14	6.3	21.8	5	5	0	0
Percent Saturation	%	n/v	42	81	40	32	50	32	81	49	42	33.6	40	50	68.6	74.8	19	8.5	46.5	5	5	0	0
Potassium	mg/kg	n/v	<2	5	<2	<2	0.77	0.77	5	2.35	2	1.02	2	2	3.8	4.4	1.57	0.7	1.98	5	2	3	0
Potassium	mg/L	n/v	2	6	<2	2	1.5	1.5	6	2.7	2	1.6	2	2	4.4	5.2	1.9	0.8	2.4	5	4	1	0
Sodium	mg/kg	n/v	3	4	<2	<2	5.2	2	5.2	3.2	3	2	2	4	4.7	5	1.4	0.6	3	5	3	2	0
Sodium	mg/L	n/v	7	5	3	3	10	3	10	5.6	5	3	3	7	8.8	9.4	3	1.3	5	5	5	0	0
Sodium Adsorption Ratio (SAR)	none	5	0.17	0.11	0.1	0.12	0.29	0.1	0.29	0.16	0.12	0.1	0.11	0.17	0.24	0.27	0.08	0.04	0.15	5	5	0	0
Soluble (CaCl2) pH	S.U.	6-8	7.05	6.36	6.99	7.07	7.03	6.36	7.07	6.79	7.03	7.07	7.05	6.99	6.52	6.43	log	log	6.9	5	5	0	0
Soluble Conductivity	dS/m	2	-	-	-	-	0.46	0.46	0.46	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	1	0	0
Sulfate	mg/kg	n/v	-	-	-	-	63	63	63	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	1	0	0
Sulfate	mg/L	n/v	-	-	-	-	130	130	130	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	1	0	0
Sulfur (as SO4)	mg/kg	n/v	86	227	5	5	-	5	227	80.8	45.5	5	5	121.2	184.7	205.8	104.7	52.4	26.4	4	4	0	0
Sulfur (as SO4)	mg/L	n/v	205	280	13	15	-	13	280	128.2	110	13.3	14.5	223.8	257.5	268.8	135.4	67.7	57.8	4	4	0	0
Theoretical Gypsum Requirement	tonnes/ha	n/v	<0.01	<0.01	<0.01	<0.01	<0.20	0.01	0.2	0.05	0.01	0.01	0.01	0.01	0.12	0.16	0.08	0.04	0.02	5	0	5	0
AENV Salinity / Sodicity Rating[c]																							
EC Rating	none	n/v	Good	Good	Fair	Good	Good	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAR Rating	none	n/v	Good	Good	Good	Good	Good	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																							
Antimony	mg/kg	20	0.8	0.5	0.7	0.8	-	0.5	0.8	0.7	0.8	0.5	0.6	0.8	0.8	0.8	0.1	0.1	0.7	4	4	0	0
Arsenic	mg/kg	12	9	7.1	11.5	**12.3**[A]	-	7.1	12.3	10	10.2	7.4	8.5	11.7	12.1	12.2	2.4	1.2	9.8	4	4	0	1
Barium	mg/kg	500	351	313	345	343	-	313	351	338	344	317.5	335.5	346.5	349.2	350.1	17	8.5	337.7	4	4	0	0
Beryllium	mg/kg	4	0.5	<0.5	0.9	0.9	-	0.5	0.9	0.7	0.7	0.5	0.5	0.9	0.9	0.9	0.2	0.1	0.7	4	3	1	0
Boron (Available)	mg/kg	n/v	0.6	1.7	<0.5	<0.5	-	0.5	1.7	0.8	0.6	0.5	0.5	0.9	1.4	1.5	0.6	0.3	0.7	4	2	2	0
Cadmium	mg/kg	10	0.5	0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	0	0.5	4	2	2	0
Chromium	mg/kg	64	20.8	12.3	22	22	-	12.3	22	19.3	21.4	13.8	18.7	22	22	22	4.7	2.3	18.8	4	4	0	0
Chromium (Hexavalent)	mg/kg	0.4	<0.3	<0.3	<0.3	<0.3	-	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0	0	0.3	4	0	4	0
Cobalt	mg/kg	50	10.1	5.9	9.9	10.3	-	5.9	10.3	9	10	6.5	8.9	10.2	10.2	10.3	2.1	1.1	8.8	4	4	0	0
Copper	mg/kg	63	25.3	17.2	23.9	25.2	-	17.2	25.3	22.9	24.5	18.2	22.2	25.2	25.3	25.3	3.9	1.9	22.6	4	4	0	0
Lead	mg/kg	140	14.7	5.9	10.4	11.3	-	5.9	14.7	10.6	10.9	6.6	9.3	12.2	13.7	14.2	3.6	1.8	10	4	4	0	0
Mercury	mg/kg	6.6	<0.5	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	0	0.5	4	0	4	0
Molybdenum	mg/kg	10	3.6	3.1	3.1	4.4	-	3.1	4.4	3.6	3.4	3.1	3.1	3.8	4.2	4.3	0.6	0.3	3.5	4	4	0	0
Nickel	mg/kg	50	27.6	17.1	25.3	25.7	-	17.1	27.6	23.9	25.5	18.3	23.2	26.2	27	27.3	4.7	2.3	23.5	4	4	0	0
Selenium	mg/kg	1	0.8	**1.2**[A]	0.8	1	-	0.8	1.2	1	0.9	0.8	0.8	1	1.1	1.2	0.2	0.1	0.9	4	4	0	1
Silver	mg/kg	20	<0.5	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	0	0.5	4	0	4	0
Thallium	mg/kg	1	<0.5	<0.5	<0.5	<0.5	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	0	0.5	4	0	4	0
Tin	mg/kg	50	0.6	2.8	0.8	0.8	-	0.6	2.8	1.2	0.8	0.6	0.8	1.3	2.2	2.5	1	0.5	1	4	4	0	0
Uranium	mg/kg	n/v	2.3	3.3	1.4	1.8	-	1.4	3.3	2.2	2	1.5	1.7	2.6	3	3.1	0.8	0.4	2.1	4	4	0	0
Vanadium	mg/kg	130	48.9	25.2	48.3	54.2	-	25.2	54.2	44.2	48.6	28.7	42.5	50.2	52.6	53.4	12.9	6.5	42.4	4	4	0	0
Zinc	mg/kg	200	67	48	57	74	-	48	74	61.5	62	49.4	54.8	68.8	71.9	73	11.4	5.7	60.7	4	4	0	0
BTEX and Petroleum Hydrocarbons																							
Benzene	mg/kg	0.5	<0.005	<0.005	<0.005	<0.005	<0.0050	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0	0	0.005	5	0	5	0
Toluene	mg/kg	0.8	<0.05	<0.05	<0.05	<0.05	<0.020	0.02	0.05	0.044	0.05	0.026	0.05	0.05	0.05	0.05	0.013	0.006	0.042	5	0	5	0
Ethylbenzene	mg/kg	1.2	<0.01	<0.01	<0.01	<0.01	<0.010	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0	0	0.01	5	0	5	0
Xylene, m & p-	mg/kg	n/v	-	-	-	-	<0.040	0.04	0.04	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	0	1	0
Xylene, o-	mg/kg	n/v	-	-	-	-	<0.020	0.02	0.02	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	0	1	0
Xylenes, Total	mg/kg	1	<0.05	<0.05	<0.05	<0.05	<0.040	0.04	0.05	0.048	0.05	0.042	0.05	0.05	0.05	0.05	0.004	0.002	0.048	5	0	5	0
PHC F1 (C6-C10 range)	mg/kg	n/v	<10	<10	<10	<10	<10	10	10	10	10	10	10	10	10	10	0	0	10	5	0	5	0
PHC F1 (C6-C10 range) minus BTEX	mg/kg	30	<10	<10	<10	<10	<10	10	10	10	10	10	10	10	10	10	0	0	10	5	0	5	0
PHC F2 (>C10-C16 range)	mg/kg	150	18	<10	<10	<10	<10	10	18	11.6	10	10	10	10	14.8	16.4	3.6	1.6	11.2	5	1	4	0
PHC F3 (>C16-C34 range)	mg/kg	400	49	233	65	24	57	24	233	85.6	57	29	49	65	165.8	199.4	83.8	37.5	63.3	5	5	0	0
PHC F4 (>C34-C50 range)	mg/kg	2,800	20	162	52	33	<50	20	162	63.4	50	22.6	33	52	118	140	56.7	25.3	48.8	5	4	1	0
Chromatogram to baseline at C50	none	n/v	-	-	-	-	YES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gravimetric Heavy Hydrocarbons	mg/kg	n/v	N/A	N/A	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Petroleum Hydrocarbons (F2-F4 Silica-Gel)																							
PHC F2 (>C10-C16 range)	mg/kg	n/v	-	-	-	-	<10	10	10	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	0	1	0
PHC F3 (>C16-C34 range)	mg/kg	n/v	-	-	-	-	57	57	57	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	1	0	0
PHC F4 (>C34-C50 range)	mg/kg	n/v	-	-	-	-	<50	50	50	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	0	1	0
Chromatogram to baseline at C50	none	n/v	-	-	-	-	YES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

NWT — NWT Environmental Guideline for Contaminated Site Remediation, November 2003

A — Table A7. Remediation Criteria for other Contaminants in soil - Residential/Parkland

D — Alberta Environment, Salt Contamination Assessment and Remediation Guidelines. Table 2.2. Soil Quality Guidelines for Unrestricted Land Use - Topsoil

	EC	SAR
Good	<2	<4
Fair	2 to 4	4 to 8
Poor	4 to 8	8 to 12
Unsuitable	>8	>12

6.5[A] — Concentration exceeds the indicated standard.

15.2 — Measured concentration did not exceed the indicated standard.

<0.50 — Laboratory reporting limit was greater than the applicable standard.

<0.03 — Analyte was not detected at a concentration greater than the laboratory reporting limit.

n/v — No standard/guideline value.

- — Parameter not analyzed / not available.

b — Where applicable, for protection of potable groundwater.

c — Assumes contamination near residence with slab-on-grade construction.

Table C.2
Summary of Soil Sample Analytical Results: Reference Samples and Statistical Calculations, Organic
Nogha K-14 Wellsite and Sump
MGM Energy Corporation

Sample Location			K-14																										
			Reference Sample (organic soil)																										
Sample Date			Control	C-201		C-202	C-203	SS9		SS10		Wellsite_SS8																	
			15-Jul-12	20-Jul-13	20-Jul-13	20-Jul-13	20-Jul-13	24-Aug-16	24-Aug-16	24-Aug-16	24-Aug-16	20-Jul-17																	
Sample ID			Control 0-40	C-201 @ 0-27cm	C-201 @ 27-42cm	C-202 @ 0-36cm	C-203 @ 0-10cm	K14_SS9_0-0.25	K14_SS9_0.25-0.5	K14_SS10_0-0.25	K14_SS10_0.25-0.5	K14_Wellsite_SS8_0.0-0.25																	
Sample Depth			0 - 0.4 m	0 - 0.27 m	0.27 - 0.42 m	0 - 0.36 m	0 - 0.1 m	0 - 0.25 m	0.25 - 0.5 m	0 - 0.25 m	0.25 - 0.5 m	0 - 0.25 m																	
Sampling Company			PRIDDIS	PRIDDIS	PRIDDIS	PRIDDIS	PRIDDIS	MGM ENERGY	MGM ENERGY	MGM ENERGY	MGM ENERGY	STANTEC																	
Laboratory		NWT	AGAT	AGAT	AGAT	AGAT	AGAT	MAXX	MAXX	MAXX	MAXX	MAXX																	
Laboratory Work Order		Table A.7	12E0621623	13E746243	13E746243	13E746243	13E746243	B674711	B674711	B674711	B674711	B761155																	
Laboratory Sample ID	Units	A	3529397	4586037	4586038	4586039	4586041	PK2577	PK2578	PK2579	PK2580	RO7252																	
													Minimum	Maximum	Mean	Median	5th	25th	75th	95th	Std. Dev.	Std. Err.	Geo. Mean	Count	Detect	ND	Exceed
General Chemistry																													
Calcium	mg/kg	n/v	183	93	289	180	91	260	200	170	130	110	91	289	170.6	175	91.9	115	195.8	262.9	276	67.3	21.3	158.8	10	10	0	0
Calcium	mg/L	n/v	42	20	125	38	33	43	53	45	73	19	19	125	49.1	42.5	19.4	34.2	51	78.2	101.6	30.9	9.6	42.4	10	10	0	0
Calcium/EC Ratio	none	n/v	-	-	-	-	-	12	13	11	10	12	10	13	11.6	12	10.2	11	12	12.6	12.8	1.1	0.5	11.6	5	5	0	0
Chloride	mg/kg	n/v	<2	60	23	28	30	<30	40	38	19	34	2	60	30.4	30	9.6	24.2	37	42	51	15	4.8	24.2	10	8	2	0
Chloride	mg/L	n/v	<5	13	10	6	11	<5.0	11	10	10	5.5	5	13	8.6	10	5	5.6	10.8	11.2	12.1	3	0.9	8.2	10	8	2	0
Conductivity in Saturated Paste	dS/m	2	0.35	0.24	1.06	0.36	0.29	-	-	-	-	-	0.24	1.06	0.46	0.35	0.25	0.29	0.36	0.78	0.92	0.34	0.15	0.39	5	5	0	0
Ion Balance	none	n/v	-	-	-	-	-	1.8	1.4	1.4	1.1	4.6	1.1	4.6	2.1	1.4	1.2	1.4	1.8	3.5	4	1.4	0.6	1.8	5	5	0	0
Magnesium	mg/kg	n/v	65	23	85	85	44	110	69	84	71	43	23	110	67.9	70	32	49.2	84.8	87.5	98.7	25.5	8.1	62.6	10	10	0	0
Magnesium	mg/L	n/v	15	5	37	18	16	17	18	23	39	7.0	5	39	19.5	17.5	5.9	15.2	21.8	37.2	38.1	11.1	3.5	16.5	10	10	0	0
Moisture Content	%	n/v	-	77	68	76	67	82	78	79	71	55	55	82	72.3	76	59.4	67	78	79.6	80.8	8.5	2.8	71.9	9	9	0	0
Organic Matter	%	n/v	-	-	-	-	-	60	59	-	-	>69	59	69	62.7	60	59.1	59.5	64.5	67.2	68.1	5.5	3.2	62.5	3	3	0	0
Percent Saturation	%	n/v	435	465	231	474	277	610	370	360	180	610	180	610	401.2	402.5	203	297.8	471.8	610	610	146.7	46.4	374.8	10	10	0	0
Potassium	mg/kg	n/v	13	9	<2	<2	<2	18	4.9	23	7.9	50	2	50	13.2	8.4	2	2.7	16.8	25.7	37.8	14.8	4.7	7.7	10	7	3	0
Potassium	mg/L	n/v	3	2	<2	<2	<2	2.9	1.3	6.4	4.3	8.2	1.3	8.2	3.4	2.4	1.6	2	4	6.6	7.4	2.2	0.7	2.9	10	7	3	0
Sodium	mg/kg	n/v	22	<2	7	9	<2	32	27	24	15	30	2	32	17	18.5	2	7.5	26.2	30.2	31.1	11.5	3.6	11.8	10	8	2	0
Sodium	mg/L	n/v	5	<2	3	2	<2	5.3	7.1	6.7	8.3	4.8	2	8.3	4.6	4.9	2	2.2	6.4	7.2	7.8	2.3	0.7	4.1	10	8	2	0
Sodium Adsorption Ratio (SAR)	none	5	0.17	0	0.06	0.07	0	0.17	0.21	0.20	0.20	0.24	0	0.24	0.13	0.17	0	0.06	0.2	0.21	0.23	0.09	0.03	0.15	10	10	0	0
Soluble (CaCl2) pH	S.U.	5-8	7.13	**2.66**[A]	**3**[A]	**5.83**[A]	**5.93**[A]	**5.66**[A]	**5.31**[A]	**5.02**[A]	**4.08**[A]	**4.49 HV**[A]	2.66	7.13	3.47851	5.14123	6.24452	5.79087	4.15198	2.95126	2.78168	log	log	4.911	10	10	0	9
Soluble Conductivity	dS/m	2	-	-	-	-	-	0.33	0.35	0.42	0.73	0.17	0.17	0.73	0.4	0.35	0.2	0.33	0.42	0.61	0.67	0.21	0.09	0.36	5	5	0	0
Sulfate	mg/kg	n/v	-	-	-	-	-	620	540	510	580	79	79	620	465.8	540	165.2	510	580	604	612	220.2	98.5	379	5	5	0	0
Sulfate	mg/L	n/v	-	-	-	-	-	100	140	140	310	13	13	310	140.6	140	30.4	100	140	242	276	108	48.3	95.4	5	5	0	0
Sulfur (as SO4)	mg/kg	n/v	522	233	1,210	502	47	-	-	-	-	-	47	1210	502.8	502	94.2	233	522	934.8	1072.4	441.9	197.6	322.2	5	5	0	0
Sulfur (as SO4)	mg/L	n/v	120	50	523	106	17	-	-	-	-	-	17	523	163.2	106	23.6	50	120	361.8	442.4	205.4	91.9	89.2	5	5	0	0
Theoretical Gypsum Requirement	tonne/ha	n/v	<0.01	<0.01	<0.01	<0.01	<0.01	<0.20	<0.20	<0.20	<0.20	<0.20	0.01	0.2	0.11	0.1	0.01	0.01	0.2	0.2	0.2	0.1	0.03	0.04	10	0	10	0
Total Organic Carbon	%	n/v	-	-	-	-	-	35	34	-	-	>40	34	40	36.3	35	34.1	34.5	37.5	39	39.5	3.2	1.9	36.2	3	3	0	0
AENV Salinity / Sodicity Rating[D]																													
EC Rating	none	n/v	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SAR Rating	none	n/v	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Properties																													
Percent Sand	%	n/v	-	-	-	-	-	-	-	53	58	63	53	63	58	58	53.5	55.5	60.5	62	62.5	5	2.9	57.9	3	3	0	0
Percent Silt	%	n/v	-	-	-	-	-	-	-	34	30	3.6	3.6	34	22.5	30	6.2	16.8	32	33.2	33.6	16.5	9.5	15.4	3	3	0	0
Percent Clay	%	n/v	-	-	-	-	-	-	-	13	13	33	13	33	19.7	13	13	13	23	29	31	11.5	6.7	17.7	3	3	0	0
Texture	none	n/v	-	-	-	-	-	-	-	LOAM	SANDYLOAM	SNDYCLLO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sieve - Pan	%	n/v	-	-	-	-	-	-	-	-	-	53	53	53	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	1	0	0
Sieve - #200 (>0.075mm)	%	n/v	-	NA	35	NA	58	-	-	-	-	47	35	58	46.7	47	36.2	41	52.5	55.8	56.9	11.5	6.6	45.7	3	3	0	0
Grain Size	none	n/v	-	-	Fine	-	Coarse	-	-	-	-	FINE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																													
Antimony	mg/kg	20	2.3	<0.5	<0.5	<0.5	0.5	-	-	-	-	-	0.5	2.3	0.9	0.5	0.5	0.5	0.5	1.6	1.9	0.8	0.4	0.7	5	2	3	0
Arsenic	mg/kg	12	10.3	1	1.4	1.8	5.8	-	-	-	-	-	1	10.3	4.1	1.8	1.1	1.4	5.8	8.5	9.4	4	1.8	2.7	5	5	0	0
Barium	mg/kg	500	255	134	199	232	**506**[B]	-	-	-	-	-	134	506	265.2	232	147	199	255	405.6	455.8	142.1	63.6	240.1	5	5	0	1
Beryllium	mg/kg	4	<0.5	<0.5	<0.5	<0.5	1.2	-	-	-	-	-	0.5	1.2	0.6	0.5	0.5	0.5	0.5	0.9	1.1	0.3	0.1	0.6	5	1	4	0
Boron (Available)	mg/kg	n/v	1.8	0.5	0.9	0.9	0.6	-	-	-	-	-	0.5	1.8	0.9	0.9	0.5	0.6	0.9	1.4	1.6	0.5	0.2	0.8	5	5	0	0
Cadmium	mg/kg	10	<0.5	<0.5	0.6	<0.5	1.2	-	-	-	-	-	0.5	1.2	0.7	0.5	0.5	0.5	0.6	1	1.1	0.3	0.1	0.6	5	2	3	0
Chromium	mg/kg	64	3.3	4.7	6.8	4	15.8	-	-	-	-	-	3.3	15.8	6.9	4.7	3.4	4	6.8	12.2	14	5.1	2.3	5.8	5	5	0	0
Chromium (Hexavalent)	mg/kg	0.4	<0.3	<0.3	<0.3	<0.3	<0.3	-	-	-	-	-	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0	0	0.3	5	0	5	0
Cobalt	mg/kg	50	3.9	1.1	1.5	0.9	7.7	-	-	-	-	-	0.9	7.7	3	1.5	0.9	1.1	3.9	6.2	6.9	2.9	1.3	2.1	5	5	0	0
Copper	mg/kg	63	6.9	4.1	10.9	5.1	45.2	-	-	-	-	-	4.1	45.2	14.4	6.9	4.3	5.1	10.9	31.5	38.3	17.4	7.8	9.3	5	5	0	0
Lead	mg/kg	140	1.1	1.3	2.8	0.8	5.6	-	-	-	-	-	0.8	5.6	2.3	1.3	0.9	1.1	2.8	4.5	5	2	0.9	1.8	5	5	0	0
Mercury	mg/kg	6.6	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	0	0.5	5	0	5	0
Molybdenum	mg/kg	10	3.9	0.6	1.1	1.7	1.3	-	-	-	-	-	0.6	3.9	1.7	1.3	0.7	1.1	1.7	3	3.5	1.3	0.6	1.4	5	5	0	0
Nickel	mg/kg	50	7.8	5	8.1	5.3	36.7	-	-	-	-	-	5	36.7	12.6	7.8	5.1	5.3	8.1	25.3	31	13.6	6.1	9.1	5	5	0	0
Selenium	mg/kg	1	0.8	<0.5	**1.1**[A]	0.8	**2**[A]	-	-	-	-	-	0.5	2	1	0.8	0.6	0.8	1.1	1.6	1.8	0.6	0.3	0.9	5	4	1	2
Silver	mg/kg	20	3.4	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	0.5	3.4	1.1	0.5	0.5	0.5	0.5	2.2	2.8	1.3	0.6	0.7	5	1	4	0
Thallium	mg/kg	1	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	0	0.5	5	0	5	0
Tin	mg/kg	50	2.2	2.9	1	0.6	0.6	-	-	-	-	-	0.6	2.9	1.5	1	0.6	0.6	2.2	2.6	2.8	1	0.5	1.2	5	5	0	0
Uranium	mg/kg	n/v	8.7	0.9	2.5	1	3.7	-	-	-	-	-	0.9	8.7	3.4	2.5	0.9	1	3.7	6.7	7.7	3.2	1.4	2.4	5	5	0	0
Vanadium	mg/kg	130	5.8	4.8	10	3.8	31.6	-	-	-	-	-	3.8	31.6	11.2	5.8	4	4.8	10	23	27.3	11.6	5.2	8	5	5	0	0
Zinc	mg/kg	200	5	36	49	10	21	-	-	-	-	-	5	49	24.2	21	6	10	36	43.8	46.4	18.3	8.2	17.9	5	5	0	0
BTEX and Petroleum Hydrocarbons																													
Benzene	mg/kg	0.5	-	<0.005	<0.005	<0.005	<0.005	<0.025 HN	<0.022 HN	<0.023 HN	<0.015 HN	<0.018 HN	0.005	0.025	0.0136667	0.015	0.005	0.005	0.022	0.0234	0.0242	0.0087034	0.0029011	0.0108791	9	0	9	0
Toluene	mg/kg	0.8	-	<0.05	<0.05	<0.05	<0.05	<0.10 HN	<0.088 HN	<0.092 HN	<0.058 HN	<0.070 HN	0.05	0.1	0.0675556	0.058	0.05	0.05	0.088	0.0936	0.0968	0.0206101	0.00687	0.0649411	9	0	9	0
Ethylbenzene	mg/kg	1.2	-	<0.01	<0.01	<0.01	<0.01	<0.050 HN	<0.044 HN	<0.046 HN	<0.029 HN	<0.035 HN	0.01	0.05	0.0271111	0.029	0.01	0.01	0.044	0.0468	0.0484	0.0173359	0.005777	0.0216098	9	0	9	0
Xylene, m & p-	mg/kg	n/v	-	-	-	-	-	<0.20 HN	<0.18 HN	<0.18 HN	<0.12 HN	<0.14 HN	0.12	0.2	0.164	0.18	0.124	0.14	0.18	0.192	0.196	0.032883	0.014697	0.161204	5	0	5	0
Xylene, o-	mg/kg	n/v	-	-	-	-	-	<0.10 HN	<0.088 HN	<0.092 HN	<0.058 HN	<0.070 HN	0.058	0.1	0.0816	0.088	0.0604	0.07	0.092	0.0968	0.0984	0.0179927	0.0076785	0.0803496	5	0	5	0
Xylenes, Total	mg/kg	1	-	<0.05	<0.05	<0.05	<0.05	<0.20 HN	<0.18 HN	<0.18 HN	<0.12 HN	<0.14 HN	0.05	0.2	0.113333	0.12	0.05	0.05	0.18	0.184	0.192	0.06442	0.021473	0.095812	9	0	9	0
PHC F1 (C6-C10 range)	mg/kg	n/v	-	<10	<10	<10	<10	***<60 HN***	***<53 HN***	***<55 HN***	***<35 HN***	***<35 HN***	10	60	30.9	35	10	10	53	56	58	21.5	7.2	23.4	9	0	9	5
PHC F1 (C6-C10 range) minus BTEX	mg/kg	30	-	<10	<10	<10	<10	***<60 HN***	***<53 HN***	***<55 HN***	***<35 HN***	***<35 HN***	10	60	30.9	35	10	10	53	56	58	21.5	7.2	23.4	9	0	9	5
PHC F2 (>C10-C16 range)	mg/kg	150	-	<10	43	14	<10	<55 HM	73 HM	<48 HM	36 HM	<22	10	73	34.6	36	10	14	48	58.6	65.8	22.2	7.4	27.6	9	4	5	0
PHC F3 (>C16-C34 range)	mg/kg	400	-	**4,270**[BC]	**4,700**[BC]	**712**[C]	176	**470 HM**[C]	**3,300 HM**[BC]	**810 HM**[C]	**1,800 HM**[BC]	160 HM	1	4700	1266.9	470	1.8	160	810	4436	4588	1876.9	625.6	198.1	9	9	0	7
PHC F4 (>C34-C50 range)	mg/kg	2,800	-	2,220	1,950	489	137	<280 HM	800 HM	300 HM	490 HM	<110	110	2220	752.9	489	120.8	280	800	2004	2112	786.4	262.1	468.7	9	7	2	0
Chromatogram to baseline at C50	none	n/v	-	-	-	-	-	YES	YES	YES	YES	YES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gravimetric Heavy Hydrocarbons	mg/kg	n/v	-	N/A	N/A	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Petroleum Hydrocarbons (F2-F4 Silica-Gel)																													
PHC F2 (>C10-C16 range)	mg/kg	n/v	-	-	-	-	-	-	-	-	-	<22 HN	22	22	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	0	1	0
PHC F3 (>C16-C34 range)	mg/kg	n/v	-	-	-	-	-	-	-	-	-	160 HN	160	160	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	1	0	0
PHC F4 (>C34-C50 range)	mg/kg	n/v	-	-	-	-	-	-	-	-	-	<110 HN	110	110	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1	0	1	0
Chromatogram to baseline at C50	none	n/v	-	-	-	-	-	-	-	-	-	YES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

NWT Table A7. Remediation Criteria for other Contaminants in soil - Residential/Parkland

[A] Table A7. Remediation Criteria for other Contaminants in soil - Residential/Parkland

[D] Alberta Environment, Salt Contamination Assessment and Remediation Guidelines. Table 2.2. Soil Quality Guidelines for Unrestricted Land Use - Topsoil

	EC	SAR
Good	<2	<4
Fair	2 to 4	4 to 8
Poor	4 to 8	8 to 12
Unsuitable	>8	>12

6.6[A] Concentration exceeds the indicated standard.

15.2 Measured concentration did not exceed the indicated standard.

<0.50 Laboratory reporting limit was greater than the applicable standard.

<0.03 Analyte was not detected at a concentration greater than the laboratory reporting limit.

n/v No standard/guideline value.

- Parameter not analyzed / not available.

HM Detection limit raised due to high moisture content.

HN Detection limit raised due to high moisture content, sample contains => 50 wt% moisture.

HV Due to high absorbtivity of the sample, the water soil extraction ratio has changed from 2:1 to 10:1

NA Not analyzed.

[B] Where applicable, for protection of potable groundwater.

[C] Assumes contamination near residence with slab-on-grade construction.

Table C.3
Summary of Soil Analytical Results
Nogha K-14 Wellsite and Sump
MGM Energy Corporation

				K-14											
				Sump											
Sample Location				Wellsite_SS6	Wellsite_SS6	Wellsite_SS7	Wellsite_SS7	Wellsite_SS7	SS18-04	SS18-04	SS18-04	SS18-04	SS18-04	SS18-06
Sample Date				20-Jul-17	20-Jul-17	20-Jul-17	20-Jul-17	20-Jul-17	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18
Sample ID				K14_Wellsite_SS6_0.0-0.25	K14_Wellsite_SS6_0.25-0.5	K14_Wellsite_SS7_0.0-0.25	K14_Wellsite_Dup 2	K14_Wellsite_SS7_0.25-0.5	K14-SS18-04 0.25 m	K14-SS18-04 0.50 m	K14-QCS18-01	K14-SS18-04 0.75 m	K14-SS18-04 1.00 m	K14-SS18-06 0.25 m
Sample Depth				0 - 0.25 m	0.25 - 0.5 m	0 - 0.25 m	0 - 0.25 m	0.25 - 0.5 m	0.25 m	0.5 m	0.5 m	0.75 m	1 m	0.25 m
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory				MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX
Laboratory Work Order				B761155	B761155	B761155	B761155	B761155	B872569	B872569	B872569	B872569	B872569	B872569
Laboratory Sample ID				RO7248	RO7249	RO7250	RO7255	RO7251	UE9938	UE9939	UE9954	UE9940	UE9941	UE9944
Sample Type							Field Duplicate				Field Duplicate			
	Units	**NWT Table A.7 A**	**NWT PHCs - Coarse B**											
General Chemistry														
Anion Sum	meq/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/kg	n/v	n/v	250	210	92	79	130	260	140	120	110	120	220
Calcium	mg/L	n/v	n/v	500	490	220	190	310	540	330	300	270	290	470
Cation Sum	meq/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Cation/EC Ratio	none	n/v	n/v	14	14	13	12	14	14	13	12	12	12	15
Chloride	mg/kg	n/v	n/v	5.6	9.2	19	11	5.1	29	22	19	19	20	4.5
Chloride	mg/L	n/v	n/v	11	22	45	25	13	62	51	46	47	47	9.6
Ion Balance	none	n/v	n/v	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Magnesium	mg/kg	n/v	n/v	95	64	36	31	44	150	64	54	46	50	190
Magnesium	mg/L	n/v	n/v	190	150	87	75	110	320	150	130	110	120	410
Moisture Content	%	n/v	n/v	29	17	20	17	15	33	20	17	-	-	-
Organic Matter	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Percent Saturation	%	n/v	n/v	49	43	42	42	40	47	43	41	40	42	47
Potassium	mg/kg	n/v	n/v	14	14	9.3	9.3	7.9	16	6.4	7.1	7.2	8.5	8.6
Potassium	mg/L	n/v	n/v	29	33	22	22	20	33	15	17	18	20	18
Sodium	mg/kg	n/v	n/v	8.5	9.4	6.3	6.7	7.1	6.2	5.9	6.3	5.5	5.9	4.2
Sodium	mg/L	n/v	n/v	17	22	15	16	18	13	14	15	14	14	9.0
Sodium Adsorption Ratio (SAR)	none	5	n/v	0.16	0.22	0.22	0.25	0.22	0.11	0.16	0.18	0.18	0.17	<0.10
Soluble (CaCl2) pH	S.U.	6-8	n/v	6.92	7.21	7.31	7.38	7.56	7.33	7.23	7.27	7.32	7.28	6.61
Soluble Conductivity	dS/m	2	n/v	**3.0[A]**	**2.8[A]**	1.5	1.4	1.9	**3.8[A]**	**2.3[A]**	**2.2[A]**	1.9	2.0	**3.8[A]**
Soluble pH	S.U.	6-8	n/v	-	-	-	-	-	-	-	-	-	-	-
Sulfate	mg/kg	n/v	n/v	990	770	350	310	450	1,100	550	470	390	440	1,200
Sulfate	mg/L	n/v	n/v	2,000	1,800	840	750	1,100	2,400	1,300	1,100	960	1,000	2,600
Sulfur (as SO4)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Sulfur (as SO4)	mg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Theoretical Gypsum Requirement	tonnes/ha	n/v	n/v	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Total Organic Carbon	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
AENV Salinity / Sodicity Rating[C]														
EC Rating	none	n/v	n/v	Fair	Fair	Good	Good	Good	Fair	Fair	Fair	Good	Good	Fair
SAR Rating	none	n/v	n/v	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good
Physical Properties														
Percent Sand	%	n/v	n/v	43	51	47	-	47	-	-	-	-	-	-
Percent Silt	%	n/v	n/v	28	22	25	-	24	-	-	-	-	-	-
Percent Clay	%	n/v	n/v	29	27	28	-	28	-	-	-	-	-	-
Texture	none	n/v	n/v	CLAYLOAM	SNDYCLLO	SNDYCLLO	-	SNDYCLLO	-	-	-	-	-	-
Sieve - Pan	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Sieve - #200 (>0.075mm)	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Grain Size	none	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
See notes on the last page														
Metals														
Antimony	mg/kg	20	n/v	0.53	0.51	<0.50	<0.50	<0.50	<0.50	0.56	0.53	-	-	-
Arsenic	mg/kg	12	n/v	9.2	8.2	7.7	12	9.7	8.7	8.0	7.5	-	-	-
Barium	mg/kg	500	n/v	170	160	160	150	150	150	230	200	-	-	150
Beryllium	mg/kg	4	n/v	0.45	0.45	0.44	0.41	0.43	<0.40	0.51	0.44	-	-	-
Boron (Available)	mg/kg	n/v	n/v	0.51	0.27	0.27	0.21	0.14	0.39	0.31	0.28	-	-	-
Cadmium	mg/kg	10	n/v	0.43	0.41	0.35	0.28	0.34	0.35	0.44	0.39	-	-	-
Chromium	mg/kg	64	n/v	15	20	19	17	24	30	30	35	-	-	-
Chromium (Hexavalent)	mg/kg	0.4	n/v	<0.080	<0.080	<0.080	<0.080	<0.080	<0.080	<0.080	<0.080	-	-	-
Cobalt	mg/kg	50	n/v	7.5	7.8	7.1	6.4	6.3	7.8	9.7	8.7	-	-	-
Copper	mg/kg	63	n/v	19	19	19	18	18	19	26	23	-	-	-
Lead	mg/kg	140	n/v	7.9	7.4	7.1	7.0	6.9	7.4	8.0	7.3	-	-	-
Mercury	mg/kg	6.6	n/v	0.063	0.087	0.054	<0.050	0.053	<0.050	<0.050	<0.050	-	-	-
Molybdenum	mg/kg	10	n/v	3.5	3.6	3.1	2.6	3.9	3.5	4.7	4.3	-	-	-
Nickel	mg/kg	50	n/v	21	23	20	19	21	27	32	32	-	-	-
Selenium	mg/kg	1	n/v	0.85	0.77	0.59	0.55	0.57	0.69	0.85	0.69	-	-	-
Silver	mg/kg	20	n/v	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	-
Thallium	mg/kg	1	n/v	0.21	0.21	0.21	0.20	0.19	0.20	0.21	0.19	-	-	-
Tin	mg/kg	50	n/v	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	-
Uranium	mg/kg	n/v	n/v	1.9	1.5	1.4	1.2	0.99	1.6	1.2	1.1	-	-	-
Vanadium	mg/kg	130	n/v	24	24	23	23	22	24	30	24	-	-	-
Zinc	mg/kg	200	n/v	53	55	51	48	46	52	65	58	-	-	-
BTEX and Petroleum Hydrocarbons														
Benzene	mg/kg	0.5	n/v	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	0.8	n/v	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	1.2	n/v	-	-	-	-	-	-	-	-	-	-	-
Xylene, m & p-	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Xylene, o-	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Xylenes, Total	mg/kg	1	n/v	-	-	-	-	-	-	-	-	-	-	-
PHC F1 (C6-C10 range)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
PHC F1 (C6-C10 range) minus BTEX	mg/kg	n/v	30L	-	-	-	-	-	-	-	-	-	-	-
F2 as a Percentage of F2+F3B	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
PHC F2 (>C10-C16 range)	mg/kg	n/v	150	-	-	-	-	-	-	-	-	-	-	-
PHC F3 (>C16-C34 range)	mg/kg	n/v	400	-	-	-	-	-	-	-	-	-	-	-
PHC F3a (C16-C22 range)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
PHC F3b (C22-C34 range)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
PHC F4 (>C34) Gravimetric	mg/kg	n/v	2800	-	-	-	-	-	-	-	-	-	-	-
PHC F4 (>C34-C50 range)	mg/kg	n/v	2800	-	-	-	-	-	-	-	-	-	-	-
Chromatogram to baseline at C50	none	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Gravimetric Heavy Hydrocarbons	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Petroleum Hydrocarbons (F2-F4 Silica-Gel)														
PHC F2 (>C10-C16 range)	mg/kg	n/v	150	-	-	-	-	-	-	-	-	-	-	-
PHC F3 (>C16-C34 range)	mg/kg	n/v	400	-	-	-	-	-	-	-	-	-	-	-
PHC F4 (>C34-C50 range)	mg/kg	n/v	2800	-	-	-	-	-	-	-	-	-	-	-
Chromatogram to baseline at C50	none	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
See notes on the last page														

Table C.3
Summary of Soil Analytical Results
Nogha K-14 Wellsite and Sump
MGM Energy Corporation

				K-14																
				Sump										Wallow - Well Centre						
Sample Location				SS18-06	SS18-06	SS18-06	SS18-06	SS18-08	SS18-08	Wollow-201	Wollow_201	Wollow-201	WC-201	Wollow_202	WC-202	WC-203	WC_Wallow	WC_Wallow	WC-WALLOW
Sample Date				19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	20-Jul-13	20-Jul-13	20-Jul-13	20-Jul-13	20-Jul-13	20-Jul-13	20-Jul-13	30-Jun-14	30-Jun-14	5-Jul-15
Sample ID				K14-SS18-06 0.50 m	K14-QCS18-02	K14-SS18-06 0.75 m	K14-SS18-08 1.10 m	K14-SS18-08 0.25 m	K14-SS18-08 0.50 m	WC Wollow 201 @ 15-35cm	Wollow 201 @ 25-55cm	WC Wollow 201 @ 35-70cm	WC-201 @ 150cm	Wollow 202 @ 25-55cm	WC-202 @ 60cm	WC-203 @ 60cm	K14 WC Wallow 0-0.15	K14 WC Wallow 0.15-0.35	K14-WC-WALLOW-0-0.15
Sample Depth				0.5 m	0.5 m	0.75 m	1.1 m	0.25 m	0.5 m	0.15 - 0.35 m	0.25 - 0.55 m	0.35 - 0.7 m	1.5 m	0.25 - 0.55 m	0.6 m	0.6 m	0 - 0.15 m	0.15 - 0.35 m	0 - 0.15 m
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	PREDIS	PREDIS	PREDIS	PREDIS	PREDIS	PREDIS	PREDIS	PREDIS	PREDIS	STANTEC
Laboratory				MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	AGAT	MAXX
Laboratory Work Order				B872569	B872569	B872569	B872569	B872569	B872569	13E740243	13E740243	13E740243	13E740243	13E740243	13E740243	13E740243	14E858192	14E858192	B557986
Laboratory Sample ID				UE0945	UE0955	UE0946	UE0947	UE0951	UE0952	4586048	4586050	4586049	4586044	4586051	4586045	4586046	5531990	5531991	MP9274
Sample Type					Field Duplicate														
	Units	**NWT Table A.7 A**	**NWT PHCs - Coarse B**																
General Chemistry																			
Anion Sum	meq/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/kg	n/v	n/v	210	180	200	230	65	120	320	757	57	25	936	17	73	857	688	2,300
Calcium	mg/L	n/v	n/v	480	460	470	500	150	250	150	116	143	82	209	46	178	363	303	550
Cation Sum	meq/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cation/EC Ratio	none	n/v	n/v	16	15	14	14	12	13	-	-	-	-	-	-	-	-	-	12
Chloride	mg/kg	n/v	n/v	4.3	<2.0	<2.2	<2.3	2.9	5.1	816	255	138	119	45	85	463	1,350	1,090	3,800
Chloride	mg/L	n/v	n/v	10	<5.0	<5.0	<5.0	6.7	11	383	39	344	383	10	237	1,130	572	480	920 CD
Ion Balance	none	n/v	n/v	1.0	1.1	1.0	1.1	1.2	1.1	-	-	-	-	-	1	-	-	-	1.0
Magnesium	mg/kg	n/v	n/v	180	170	120	92	26	47	149	261	25	12	336	8	25	293	243	940
Magnesium	mg/L	n/v	n/v	410	420	280	200	59	100	70	40	62	39	75	21	61	124	107	230
Moisture Content	%	n/v	n/v	-	-	-	-	18	18	26	80	16	21	77	16	15	-	-	76
Organic Matter	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Percent Saturation	%	n/v	n/v	43	40	43	45	44	47	213	653	40	31	448	36	41	236	227	420
Potassium	mg/kg	n/v	n/v	12	11	14	15	2.9	4.8	53	39	4	3	9	2	6	194	148	220
Potassium	mg/L	n/v	n/v	29	27	33	34	6.6	10	25	6	11	11	2	6	14	82	65	53
Sodium	mg/kg	n/v	n/v	5.5	4.7	5.8	6.4	6.7	6.6	547	124	40	83	<2	61	222	765	606	2,100
Sodium	mg/L	n/v	n/v	13	12	14	14	15	14	257	19	100	268	<2	169	541	324	267	500
Sodium Adsorption Ratio (SAR)	none	5	n/v	0.10	0.10	0.12	0.13	0.27	0.19	4.34	0.39	1.76	**6.1[A]**	0	**5.18[A]**	**8.92[A]**	3.74	3.36	4.6
Soluble (CaCl2) pH	S.U.	6-8	n/v	7.07	7.05	7.10	7.35	7.05	6.99	**5.38[A]**	**4.51[A]**	6.61	6.8	**5.8[A]**	7.15	6.62	6.42	6.18	**5.48[A]**
Soluble Conductivity	dS/m	2	n/v	**3.8[A]**	**3.8[A]**	**3.3[A]**	**3.1[A]**	1.1	1.7	**2.77[A]**	1.15	1.94	**2.32[A]**	1.73	1.31	**4.65[A]**	**3.86[A]**	**3.29[A]**	**5.8[A]**
Soluble pH	S.U.	6-8	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**5.54[A]**
Sulfate	mg/kg	n/v	n/v	1,200	1,100	960	880	230	440	-	-	-	-	-	-	-	-	-	8,200
Sulfate	mg/L	n/v	n/v	2,700	2,700	2,200	2,000	520	940	-	-	-	-	-	-	-	881	651	2,000
Sulfur (as SO4)	mg/kg	n/v	n/v	-	-	-	-	-	-	959	3,410	120	116	4,090	65	247	2,080	1,480	-
Sulfur (as SO4)	mg/L	n/v	n/v	-	-	-	-	-	-	450	522	301	373	912	181	602	-	-	-
Theoretical Gypsum Requirement	tonnes/ha	n/v	n/v	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.6	<0.01	<0.01	9.8
Total Organic Carbon	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AENV Salinity / Sodicity Rating[C]																			
EC Rating	none	n/v	n/v	Fair	Fair	Fair	Fair	Good	Good	Fair	Good	Good	Fair	Good	Good	Poor	Fair	Fair	Poor
SAR Rating	none	n/v	n/v	Good	Good	Good	Good	Good	Good	Fair	Good	Good	Fair	Good	Fair	Poor	Good	Good	Fair
Physical Properties																			
Percent Sand	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47
Percent Silt	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	46 SK
Percent Clay	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.2
Texture	none	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	SANDYLOAM
Sieve - Pan	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sieve - #200 (>0.075mm)	%	n/v	n/v	-	-	-	-	-	-	54	NA	56	47	NA	50	50	-	-	-
Grain Size	none	n/v	n/v	-	-	-	-	-	-	Coarse	-	Coarse	Fine	-	Coarse	Coarse	-	-	-
See notes on the last page																			
Metals																			
Antimony	mg/kg	20	n/v	-	-	-	-	<0.50	<0.50	<0.5	0.5	0.7	-	<0.5	-	-	-	-	<1.0
Arsenic	mg/kg	12	n/v	-	-	-	-	12	9.5	5.6	0.7	8	-	0.9	-	-	-	-	<2.0
Barium	mg/kg	500	n/v	130	130	-	-	200	220	332	119	340	-	126	-	-	-	-	330
Beryllium	mg/kg	4	n/v	-	-	-	-	0.46	0.46	0.6	<0.5	0.8	-	<0.5	-	-	-	-	<0.80
Boron (Available)	mg/kg	n/v	n/v	-	-	-	-	0.27	0.36	1.9	2	<0.5	-	4.7	-	-	-	-	1.7 AW
Cadmium	mg/kg	10	n/v	-	-	-	-	0.29	0.33	0.6	<0.5	<0.5	-	0.5	-	-	-	-	0.23
Chromium	mg/kg	64	n/v	-	-	-	-	18	16	14.2	4	19.6	-	5.7	-	-	-	-	3.7
Chromium (Hexavalent)	mg/kg	0.4	n/v	-	-	-	-	<0.080	<0.080	<0.3	<0.3	<0.3	-	<0.3	-	-	-	-	<0.080
Cobalt	mg/kg	50	n/v	-	-	-	-	7.9	6.7	7.3	2.7	9.4	-	2.6	-	-	-	-	1.6
Copper	mg/kg	63	n/v	-	-	-	-	19	18	22.8	4.6	23.5	-	5.7	-	-	-	-	8.6
Lead	mg/kg	140	n/v	-	-	-	-	7.7	7.8	6.5	0.7	9.8	-	1.2	-	-	-	-	2.8
Mercury	mg/kg	6.6	n/v	-	-	-	-	<0.050	<0.050	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	<0.10
Molybdenum	mg/kg	10	n/v	-	-	-	-	3.6	2.4	2.1	1.5	3.9	-	1.3	-	-	-	-	1.3
Nickel	mg/kg	50	n/v	-	-	-	-	22	21	22.7	5.6	25.2	-	6.9	-	-	-	-	4.9
Selenium	mg/kg	1	n/v	-	-	-	-	<0.50	0.56	**1.2[A]**	0.8	**1.3[A]**	-	0.8	-	-	-	-	<1.0
Silver	mg/kg	20	n/v	-	-	-	-	<0.20	<0.20	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	<0.40
Thallium	mg/kg	1	n/v	-	-	-	-	0.16	0.15	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	<0.20
Tin	mg/kg	50	n/v	-	-	-	-	<1.0	<1.0	<0.5	<0.5	0.6	-	<0.5	-	-	-	-	<2.0
Uranium	mg/kg	n/v	n/v	-	-	-	-	0.68	0.81	3.1	0.8	2.3	-	1.3	-	-	-	-	1.8
Vanadium	mg/kg	130	n/v	-	-	-	-	22	22	33.5	4.3	45.3	-	5.9	-	-	-	-	6.1
Zinc	mg/kg	200	n/v	-	-	-	-	48	47	48	53	68	-	87	-	-	-	-	<20
BTEX and Petroleum Hydrocarbons																			
Benzene	mg/kg	0.5	n/v	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-
Toluene	mg/kg	0.8	n/v	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	-
Ethylbenzene	mg/kg	1.2	n/v	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-
Xylene, m & p-	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylene, o-	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, Total	mg/kg	1	n/v	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	-
PHC F1 (C6-C10 range)	mg/kg	n/v	n/v	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10	<10	-	-	-
PHC F1 (C6-C10 range) minus BTEX	mg/kg	n/v	30L	-	-	-	-	-	-	<10	<10	<10	<10	<10	<10	<10	-	-	-
F2 as a Percentage of F2+F3B	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHC F2 (>C10-C16 range)	mg/kg	n/v	150	-	-	-	-	-	-	<10	<10	<10	<10	16	17	21	-	-	-
PHC F3 (>C16-C34 range)	mg/kg	n/v	400	-	-	-	-	-	-	317	**734[B]**	82	142	**1,100[B]**	104	125	-	-	-
PHC F3a (C16-C22 range)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHC F3b (C22-C34 range)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHC F4 (>C34) Gravimetric	mg/kg	n/v	2800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHC F4 (>C34-C50 range)	mg/kg	n/v	2800	-	-	-	-	-	-	203	514	58	157	675	112	78	-	-	-
Chromatogram to baseline at C50	none	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gravimetric Heavy Hydrocarbons	mg/kg	n/v	n/v	-	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	-	-
Petroleum Hydrocarbons (F2-F4 Silica-Gel)																			
PHC F2 (>C10-C16 range)	mg/kg	n/v	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHC F3 (>C16-C34 range)	mg/kg	n/v	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHC F4 (>C34-C50 range)	mg/kg	n/v	2800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromatogram to baseline at C50	none	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
See notes on the last page																			

Table C.3
Summary of Soil Analytical Results
Nogha K-14 Wellsite and Sump
MGM Energy Corporation

				K-14														
				Wallow - Well Centre														
Sample Location				WC-WALLOW	SS18-01	SS18-01	SS18-01	SS18-01	SS18-02	SS18-02	SS18-02	SS18-02	SS18-02	SS18-03	SS18-03	SS18-03	SS18-03
Sample Date				5-Jul-15	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18
Sample ID				K14-WC-WALLOW-0.15-0.3	K14-SS18-01 0.25 m	K14-SS18-01 0.25 m	K14-SS18-01 0.50 m	K14-SS18-01 0.50 m	K14-SS18-02 0.25 m	K14-SS18-02 0.25 m	K14-SS18-02 0.50 m	K14-SS18-02 0.50 m	K14-SS18-02 0.75 m	K14-SS18-03 0.25 m	K14-SS18-03 0.25 m	K14-SS18-03 0.50 m	K14-SS18-03 0.50 m
Sample Depth				0.15 - 0.3 m	0.25 m	0.25 m	0.5 m	0.5 m	0.25 m	0.25 m	0.5 m	0.5 m	0.75 m	0.25 m	0.25 m	0.5 m	0.5 m
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory				MAXX	MAXX	B6M5203	B872569	B6M5203	B872569	B6M5203	B872569	B6M5203	B872569	B872569	B6M5203	B872569	B6M5203
Laboratory Work Order		NWT		B557986	B872569	B6M5203	B872569	B6M5203	B872569	B6M5203	B872569	B6M5203	B872569	B872569	B6M5203	B872569	B6M5203
Laboratory Sample ID		Table A.7	PHCs - Coarse	MP9275	UE0931	HPT815	UE0932	HPT816	UE0933	HPT817	UE0934	HPT818	UE0935	UE0936	HPT819	UE0937	HPT820
Sample Type	**Units**	A	B														
General Chemistry																	
Anion Sum	meq/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/kg	n/v	n/v	340	2,400	-	160	-	1,600	-	170	-	110	190	-	250	-
Calcium	mg/L	n/v	n/v	440	570	-	380	-	730	-	290	-	250	250	-	510	-
Cation Sum	meq/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cation/EC Ratio	none	n/v	n/v	13	15	-	13	-	13	-	12	-	12	12	-	14	-
Chloride	mg/kg	n/v	n/v	350	160	-	5.7	-	1,700	-	38	-	18	76	-	24	-
Chloride	mg/L	n/v	n/v	440 CD	38	-	13	-	750 CD	-	66	-	42	100	-	49	-
Ion Balance	none	n/v	n/v	1.1	1.1	-	1.2	-	1.2	-	1.2	-	1.2	1.1	-	1.0	-
Magnesium	mg/kg	n/v	n/v	140	1,100	-	64	-	520	-	52	-	34	98	-	160	-
Magnesium	mg/L	n/v	n/v	180	270	-	150	-	240	-	90	-	80	140	-	330	-
Moisture Content	%	n/v	n/v	55	75	-	17	-	68	-	27	-	20	71	-	21	-
Organic Matter	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Percent Saturation	%	n/v	n/v	78	420	-	42	-	220	-	57	-	43	73	-	49	-
Potassium	mg/kg	n/v	n/v	20	62	-	10	-	160	-	15	-	11	6.5	-	7.7	-
Potassium	mg/L	n/v	n/v	25	15	-	24	-	71	-	26	-	25	8.9	-	16	-
Sodium	mg/kg	n/v	n/v	260	270	-	14	-	1,100	-	75	-	36	26	-	12	-
Sodium	mg/L	n/v	n/v	330	63	-	33	-	490	-	130	-	84	35	-	24	-
Sodium Adsorption Ratio (SAR)	none	5	n/v	3.3	0.55	-	0.36	-	4.1	-	1.7	-	1.2	0.44	-	0.20	-
Soluble (CaCl2) pH	S.U.	6-8	n/v	6.47	**5.75 HV[A]**	-	6.89	-	6.77	-	6.88	-	6.99	6.22	-	6.51	-
Soluble Conductivity	dS/m	2	n/v	**4.1[A]**	**3.5[A]**	-	**2.5[A]**	-	**6.0[A]**	-	**2.3[A]**	-	2.0	**2.1[A]**	-	**3.6[A]**	-
Soluble pH	S.U.	6-8	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	mg/kg	n/v	n/v	1,400	9,300	-	580	-	4,800	-	610	-	390	680	-	1,200	-
Sulfate	mg/L	n/v	n/v	1,800	2,200	-	1,400	-	2,100	-	1,100	-	920	930	-	2,500	-
Sulfur (as SO4)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur (as SO4)	mg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Theoretical Gypsum Requirement	tonnes/ha	n/v	n/v	<0.20	<0.20	-	<0.20	-	0.47	-	<0.20	-	<0.20	<0.20	-	<0.20	-
Total Organic Carbon	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon	mg/kg	n/v	n/v	-	-	370,000	-	24,000	-	340,000	-	79,000	-	-	71,000	-	43,000
AENV Salinity / Sodicity Rating[C]																	
EC Rating	none	n/v	n/v	Poor	Fair	-	Fair	-	Poor	-	Fair	-	Good	Fair	-	Fair	-
SAR Rating	none	n/v	n/v	Good	Good	-	Good	-	Fair	-	Good	-	Good	Good	-	Good	-
Physical Properties																	
Percent Sand	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Percent Silt	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Percent Clay	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Texture	none	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sieve - Pan	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sieve - #200 (>0.075mm)	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grain Size	none	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-

See notes on the last page

Metals																	
Antimony	mg/kg	20	n/v	<0.50	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	12	n/v	5.2	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/kg	500	n/v	210	260	-	180	-	170	-	190	-	170	220	-	-	-
Beryllium	mg/kg	4	n/v	<0.40	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (Available)	mg/kg	n/v	n/v	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/kg	10	n/v	0.36	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/kg	64	n/v	18	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Hexavalent)	mg/kg	0.4	n/v	<0.080	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	mg/kg	50	n/v	6.4	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/kg	63	n/v	20	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/kg	140	n/v	6.7	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/kg	6.6	n/v	<0.050	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/kg	10	n/v	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/kg	50	n/v	21	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/kg	1	n/v	0.69	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/kg	20	n/v	<0.20	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/kg	1	n/v	0.16	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/kg	50	n/v	<1.0	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	mg/kg	n/v	n/v	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/kg	130	n/v	22	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/kg	200	n/v	51	-	-	-	-	-	-	-	-	-	-	-	-	-
BTEX and Petroleum Hydrocarbons																	
Benzene	mg/kg	0.5	n/v	-	<0.030 HN	-	<0.0050	-	<0.020 HN	-	<0.0050	-	<0.0050	<0.023 HN	-	<0.0050	-
Toluene	mg/kg	0.8	n/v	-	<0.12 HN	-	<0.020	-	<0.080 HN	-	<0.020	-	<0.020	<0.090 HN	-	<0.020	-
Ethylbenzene	mg/kg	1.2	n/v	-	<0.059 HN	-	<0.010	-	<0.040 HN	-	<0.010	-	<0.010	<0.045 HN	-	<0.010	-
Xylene, m & p-	mg/kg	n/v	n/v	-	<0.24 HN	-	<0.040	-	<0.16 HN	-	<0.040	-	<0.040	<0.18 HN	-	<0.040	-
Xylene, o-	mg/kg	n/v	n/v	-	<0.12 HN	-	<0.020	-	<0.080 HN	-	<0.020	-	<0.020	<0.090 HN	-	<0.020	-
Xylenes, Total	mg/kg	1	n/v	-	<0.26	-	<0.045	-	<0.18	-	<0.045	-	<0.045	<0.20	-	<0.045	-
PHC F1 (C6-C10 range)	mg/kg	n/v	n/v	-	<59 HN	-	<10	-	<40 HN	-	<10	-	<10	<45 HN	-	<10	-
PHC F1 (C6-C10 range) minus BTEX	mg/kg	n/v	30L	-	**<59**	-	<10	-	**<40**	-	<10	-	<10	**<45**	-	<10	-
F2 as a Percentage of F2+F3B	mg/kg	n/v	n/v	-	7.2	-	NC	-	11	-	NC	-	-	7.3	-	NC	-
PHC F2 (>C10-C16 range)	mg/kg	n/v	150	-	100 HN	-	<10	-	**190 HN[B]**	-	<10	-	-	55 HN	-	<10	-
PHC F3 (>C16-C34 range)	mg/kg	n/v	400	-	**2,000[B]**	-	<71	-	**2,400[B]**	-	77	-	-	**920[B]**	-	86	-
PHC F3a (C16-C22 range)	mg/kg	n/v	n/v	-	700 HN	-	<50	-	830 HN	-	<50	-	-	220 HN	-	<50	-
PHC F3b (C22-C34 range)	mg/kg	n/v	n/v	-	1,300 HN	-	57	-	1,600 HN	-	77	-	-	700 HN	-	86	-
PHC F4 (>C34) Gravimetric	mg/kg	n/v	2800	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHC F4 (>C34-C50 range)	mg/kg	n/v	2800	-	210 HN	-	<50	-	290 HN	-	<50	-	-	<170 HN	-	<50	-
Chromatogram to baseline at C50	none	n/v	n/v	-	YES	-	YES	-	YES	-	YES	-	-	YES	-	YES	-
Gravimetric Heavy Hydrocarbons	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Petroleum Hydrocarbons (F2-F4 Silica-Gel)																	
PHC F2 (>C10-C16 range)	mg/kg	n/v	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHC F3 (>C16-C34 range)	mg/kg	n/v	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHC F4 (>C34-C50 range)	mg/kg	n/v	2800	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromatogram to baseline at C50	none	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-

See notes on the last page

Table C.3
Summary of Soil Analytical Results
Nogha K-14 Wellsite and Sump
MGM Energy Corporation

				K-14												
				Wallow - Well Centre										Wallow 1		
Sample Location				SS22-01	SS22-01	SS22-02	SS22-02	SS22-02	SS22-03	SS22-03	SS22-04	SS22-04	Wallow-1	SS1	SS1
Sample Date				12-Aug-22	12-Aug-22	12-Aug-22	12-Aug-22	12-Aug-22	12-Aug-22	12-Aug-22	12-Aug-22	12-Aug-22	15-Jul-12	24-Aug-16	24-Aug-16
Sample ID				K14-SS22-01-01	K14-SS22-01-02	K14-SS22-02-01	K14-SS22-02-02	K14-QCS22-05	K14-SS22-03-01	K14-SS22-03-02	K14-SS22-04-01	K14-SS22-04-02	Wallow 1 0-58	K14_SS1_0-0.25	K14_SS1_0.25-0.5
Sample Depth				0.15 - 0.25 m	0.5 - 0.75 m	0.15 - 0.25 m	0.5 - 0.75 m	0.5 - 0.75 m	0.15 - 0.25 m	0.5 - 0.75 m	0.15 - 0.25 m	0.5 - 0.75 m	0 - 0.58 m	0 - 0.25 m	0.25 - 0.5 m
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	PREDIS	MGM ENERGY	MGM ENERGY
Laboratory				BV	BV	BV	BV	BV	BV	BV	BV	BV	AGAT	MAXX	MAXX
Laboratory Work Order				C262216	C262216	C262216	C262216	C262216	C262216	C262216	C262216	C262216	12E621623	B674711	B674711
Laboratory Sample ID				AZY993	AZY994	AZY995	AZY996	AZZ001	AZY997	AZY998	AZY999	AZZ000	3529401	PK2378	PK2379
Sample Type	**Units**	**NWT Table A.7 A**	**NWT PHCs - Coarse B**					Field Duplicate							
General Chemistry															
Anion Sum	meq/L	n/v	n/v	5.1	77	11	13	13	13	72	23	22	-	-	-
Boron	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/kg	n/v	n/v	260	340	200	150	85	200	250	150	100	1,770	700	1,600
Calcium	mg/L	n/v	n/v	49	520	94	150	140	120	630	230	260	341	93	560
Cation Sum	meq/L	n/v	n/v	6.2	68	12	15	13	13	65	24	23	-	-	-
Cation/EC Ratio	none	n/v	n/v	8.9	16	11	12	11	11	17	13	12	-	7.6	13
Chloride	mg/kg	n/v	n/v	<53	49	<21	<9.8	<5.9	<16	45	<6.4	6.7	1,530	53	<15
Chloride	mg/L	n/v	n/v	<10	74	<10	<10	<10	<10	110	<10	17	295	7.2	<5.0
Ion Balance	none	n/v	n/v	-	-	-	-	-	-	-	-	-	-	0.96	1.0
Magnesium	mg/kg	n/v	n/v	170	330	140	73	37	120	160	87	39	929	150	400
Magnesium	mg/L	n/v	n/v	32	500	66	74	63	76	390	140	100	179	20	140
Moisture Content	%	n/v	n/v	78	30	79	22	26	72	16	25	16	77	80	79
Organic Matter	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	>69	59
Percent Saturation	%	n/v	n/v	530	66	210	98	59	160	40	64	38	519	750	290
Potassium	mg/kg	n/v	n/v	13	3.1	10	8.5	6.9	4.0	6.8	2.2	3.8	88	56	23
Potassium	mg/L	n/v	n/v	2.5	4.7	4.8	8.6	12	2.5	17	3.5	9.8	17	7.5	7.9
Sodium	mg/kg	n/v	n/v	42	13	67	18	9.6	32	9.9	20	11	623	31	18
Sodium	mg/L	n/v	n/v	8.0	19	32	18	16	20	25	31	29	120	4.2	6.2
Sodium Adsorption Ratio (SAR)	none	5	n/v	0.22	0.15	0.62	0.30	0.28	0.34	0.19	0.39	0.39	1.31	0.10	<0.10
Soluble (CaCl2) pH	S.U.	6-8	n/v	**3.12 SRP[A]**	**4.28[A]**	**3.88[A]**	6.66	7.12	**5.85[A]**	6.58	6.61	7.58	**3.84[A]**	**3.47[A]**	**3.61[A]**
Soluble Conductivity	dS/m	2	n/v	0.70	**4.4[A]**	1.0	1.3	1.3	1.2	**3.9[A]**	1.9	1.9	**3.17[A]**	0.92	**3.0[A]**
Soluble pH	S.U.	6-8	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	mg/kg	n/v	n/v	1,300	2,400	1,100	630	370	970	1,300	720	400	-	2,500	5,500
Sulfate	mg/L	n/v	n/v	250	3,600	540	640	630	600	3,300	1,100	1,000	-	340	1,900
Sulfur (as SO4)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	6,900	-	-
Sulfur (as SO4)	mg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	1,330	-	-
Theoretical Gypsum Requirement	tonnes/ha	n/v	n/v	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.01	<0.20	<0.20
Total Organic Carbon	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	>40	34
Total Organic Carbon	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
AENV Salinity / Sodicity Rating[C]															
EC Rating	none	n/v	n/v	Good	Poor	Good	Good	Good	Good	Fair	Good	Good	Fair	Good	Fair
SAR Rating	none	n/v	n/v	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good
Physical Properties															
Percent Sand	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Percent Silt	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Percent Clay	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Texture	none	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Sieve - Pan	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Sieve - #200 (>0.075mm)	%	n/v	n/v	-	-	-	-	-	-	-	-	-	ORG	-	-
Grain Size	none	n/v	n/v	-	-	-	-	-	-	-	-	-	Fine	-	-

See notes on the last page

Metals															
Antimony	mg/kg	20	n/v	-	-	-	-	-	-	-	-	-	<0.5	-	-
Arsenic	mg/kg	12	n/v	-	-	-	-	-	-	-	-	-	1.2	-	-
Barium	mg/kg	500	n/v	-	-	-	-	-	-	-	-	-	104	-	-
Beryllium	mg/kg	4	n/v	-	-	-	-	-	-	-	-	-	<0.5	-	-
Boron (Available)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	5.7	-	-
Cadmium	mg/kg	10	n/v	-	-	-	-	-	-	-	-	-	0.6	-	-
Chromium	mg/kg	64	n/v	-	-	-	-	-	-	-	-	-	5.2	-	-
Chromium (Hexavalent)	mg/kg	0.4	n/v	-	-	-	-	-	-	-	-	-	<0.3	-	-
Cobalt	mg/kg	50	n/v	-	-	-	-	-	-	-	-	-	2.6	-	-
Copper	mg/kg	63	n/v	-	-	-	-	-	-	-	-	-	8.5	-	-
Lead	mg/kg	140	n/v	-	-	-	-	-	-	-	-	-	2.1	-	-
Mercury	mg/kg	6.6	n/v	-	-	-	-	-	-	-	-	-	<0.5	-	-
Molybdenum	mg/kg	10	n/v	-	-	-	-	-	-	-	-	-	0.8	-	-
Nickel	mg/kg	50	n/v	-	-	-	-	-	-	-	-	-	7.3	-	-
Selenium	mg/kg	1	n/v	-	-	-	-	-	-	-	-	-	0.8	-	-
Silver	mg/kg	20	n/v	-	-	-	-	-	-	-	-	-	<0.5	-	-
Thallium	mg/kg	1	n/v	-	-	-	-	-	-	-	-	-	<0.5	-	-
Tin	mg/kg	50	n/v	-	-	-	-	-	-	-	-	-	<0.5	-	-
Uranium	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	1.9	-	-
Vanadium	mg/kg	130	n/v	-	-	-	-	-	-	-	-	-	5.8	-	-
Zinc	mg/kg	200	n/v	-	-	-	-	-	-	-	-	-	131	-	-
BTEX and Petroleum Hydrocarbons															
Benzene	mg/kg	0.5	n/v	<0.033 DLSW	<0.0050	<0.040 DLSW	<0.0050	<0.0050	<0.025 DLSW	<0.0050	<0.0050	<0.0050	<0.005	<0.030 HN AW	<0.028 HN AW
Toluene	mg/kg	0.8	n/v	<0.12 DLSW	<0.050	<0.15 DLSW	<0.050	<0.050	<0.094 DLSW	<0.050	<0.050	<0.050	<0.05	<0.12 HN AW	<0.11 HN AW
Ethylbenzene	mg/kg	1.2	n/v	<0.049 DLSW	<0.010	<0.060 DLSW	<0.010	<0.010	<0.037 DLSW	<0.010	<0.010	<0.010	<0.01	<0.059 HN AW	<0.056 HN AW
Xylene, m & p-	mg/kg	n/v	n/v	<0.27 WSA	<0.040	<0.34 WSA	<0.040	<0.040	<0.21 WSA	<0.040	<0.040	<0.040	-	<0.24 HN AW	<0.22 HN AW
Xylene, o-	mg/kg	n/v	n/v	<0.14 WSA	<0.020	<0.17 WSA	<0.020	<0.020	<0.10 WSA	<0.020	<0.020	<0.020	-	<0.12 HN AW	<0.11 HN AW
Xylenes, Total	mg/kg	1	n/v	<0.31	<0.045	<0.37	<0.045	<0.045	<0.23	<0.045	<0.045	<0.045	<0.05	<0.040 HN AW	<0.040 HN AW
PHC F1 (C6-C10 range)	mg/kg	n/v	n/v	<51 DLSW	<10	<62 DLSW	<10	<10	<38 DLSW	<10	<10	<10	<10	<71 HN AW	<67 HN AW
PHC F1 (C6-C10 range) minus BTEX	mg/kg	n/v	30L	**<51**	<10	**<62**	<10	<10	**<38**	<10	<10	<10	<10	<12 HN AW	<12 HN AW
F2 as a Percentage of F2+F3B	mg/kg	n/v	n/v	2.2	4.7	-	-	-	-	-	-	-	-	-	-
PHC F2 (>C10-C16 range)	mg/kg	n/v	150	100 HN	24	61 HN	<10	<10	54 HN	<10	11	<10	12	<51 HM	<48 HM
PHC F3 (>C16-C34 range)	mg/kg	n/v	400	**4,900[B]**	**560[B]**	**1,600 HN[B]**	190	120	**980 HN[B]**	110	220	120	**951[B]**	**800 HM[B]**	**830 HM[B]**
PHC F3a (C16-C22 range)	mg/kg	n/v	n/v	350 HN	89	-	-	-	-	-	-	-	-	-	-
PHC F3b (C22-C34 range)	mg/kg	n/v	n/v	4,500 HN	470	-	-	-	-	-	-	-	-	-	-
PHC F4 (>C34) Gravimetric	mg/kg	n/v	2800	**5,300 HN[B]**	1,100 HN	-	-	-	-	-	-	-	-	-	-
PHC F4 (>C34-C50 range)	mg/kg	n/v	2800	2,200 HN	330	820 HN	110	55	450 HN	71	98	67	317	<250 HM	<240 HM
Chromatogram to baseline at C50	none	n/v	n/v	NO	NO	YES	YES	YES	YES	YES	YES	YES	-	YES	YES
Gravimetric Heavy Hydrocarbons	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	N/A	-	-
Petroleum Hydrocarbons (F2-F4 Silica-Gel)															
PHC F2 (>C10-C16 range)	mg/kg	n/v	150	-	-	-	-	-	-	-	-	-	-	-	-
PHC F3 (>C16-C34 range)	mg/kg	n/v	400	-	-	-	-	-	-	-	-	-	-	-	-
PHC F4 (>C34-C50 range)	mg/kg	n/v	2800	-	-	-	-	-	-	-	-	-	-	-	-
Chromatogram to baseline at C50	none	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-

See notes on the last page

Table C.3
Summary of Soil Analytical Results
Nogha K-14 Wellsite and Sump
MGM Energy Corporation

				K-14										
				Wallow 1										
Sample Location				SS2	SS2	Wellsite_SS1	Wellsite_SS1	Wellsite_SS1	SS18-07	SS18-07	SS18-07	SS18-07	SS18-07	SS18-07
Sample Date				24-Aug-16	24-Aug-16	20-Jul-17	20-Jul-17	20-Jul-17	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18	19-Aug-18
Sample ID				K14_SS2_0-0.25	K14_SS2_0.25-0.5	K14_Wellsite_SS1_0.0-0.25	K14_Wellsite_SS1_0.25-0.5	K14_Wellsite_Dup 1	K14-SS18-07 0.25 m	K14-SS18-07 0.25 m	K14-SS18-07 0.50 m	K14-SS18-07 0.50 m	K14-SS18-07 0.75 m	K14-QCS18-03
Sample Depth				0 - 0.25 m	0.25 - 0.5 m	0 - 0.25 m	0.25 - 0.5 m	0.25 - 0.5 m	0.25 m	0.25 m	0.5 m	0.5 m	0.75 m	0.75 m
Sampling Company				MGM ENERGY	MGM ENERGY	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory				MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX
Laboratory Work Order		NWT		B674711	B674711	B761155	B761155	B761155	B872569	B8M5203	B872569	B8M5203	B872569	B872569
Laboratory Sample ID		Table A.7	PHCs - Coarse	PK2380	PK2381	RO7242	RO7243	RO7254	UE0948	HPT822	UE0949	HPT823	UE0950	UE0956
Sample Type	**Units**	**A**	**B**					**Field Duplicate**						**Field Duplicate**
General Chemistry														
Anion Sum	meq/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/kg	n/v	n/v	510	940	-	-	-	890	-	360	-	97	89
Calcium	mg/L	n/v	n/v	46	120	-	-	-	240	-	590	-	230	200 EC
Cation Sum	meq/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Cation/EC Ratio	none	n/v	n/v	7.8	9.2	-	-	-	11	-	16	-	12	11
Chloride	mg/kg	n/v	n/v	72	<38	-	-	-	30	-	360	-	<2.1	<2.2
Chloride	mg/L	n/v	n/v	6.5	<5.0	-	-	-	8.1	-	600 CD	-	<5.0	<5.0
Ion Balance	none	n/v	n/v	1.0	1.0	-	-	-	1.1	-	0.63	-	1.2	1.2
Magnesium	mg/kg	n/v	n/v	120	220	-	-	-	190	-	410	-	30	22
Magnesium	mg/L	n/v	n/v	11	29	-	-	-	51	-	680	-	72	51
Moisture Content	%	n/v	n/v	84	81	73	53	61	64	-	48	-	18	17
Organic Matter	%	n/v	n/v	>69	44	-	-	-	-	-	-	-	-	-
Percent Saturation	%	n/v	n/v	1,100	770	-	-	-	370	-	61	-	42	44
Potassium	mg/kg	n/v	n/v	100	57	-	-	-	37	-	11	-	5.1	6.7
Potassium	mg/L	n/v	n/v	9.4	7.5	-	-	-	9.9	-	18	-	12	15
Sodium	mg/kg	n/v	n/v	50	34	-	-	-	10	-	4.5	-	2.8	2.9
Sodium	mg/L	n/v	n/v	4.5	4.4	-	-	-	2.7	-	7.4	-	6.7	6.6
Sodium Adsorption Ratio (SAR)	none	5	n/v	0.16	<0.10	-	-	-	<0.10	-	<0.10	-	0.10	0.11
Soluble (CaCl2) pH	S.U.	6-8	n/v	**3.40**[A]	**3.54**[A]	-	-	-	**4.02 HV**[A]	-	**4.39**[A]	-	7.36	7.49
Soluble Conductivity	dS/m	2	n/v	0.52	1.0	-	-	-	1.5	-	**5.4**[A]	-	1.6	1.3
Soluble pH	S.U.	6-8	n/v	-	-	-	-	-	-	-	-	-	-	-
Sulfate	mg/kg	n/v	n/v	2,000	3,400	-	-	-	2,700	-	3,500	-	320	270
Sulfate	mg/L	n/v	n/v	180	440	-	-	-	710	-	5,800	-	760	620 EC
Sulfur (as SO4)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Sulfur (as SO4)	mg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Theoretical Gypsum Requirement	tonnes/ha	n/v	n/v	<0.20	<0.20	-	-	-	<0.20	-	<0.20	-	<0.20	<0.20
Total Organic Carbon	%	n/v	n/v	>40	26	-	-	-	-	-	-	-	-	-
Total Organic Carbon	mg/kg	n/v	n/v	-	-	-	-	-	-	230,000	-	83,000	-	-
AENV Salinity / Sodicity Rating[C]														
EC Rating	none	n/v	n/v	Good	Good	-	-	-	Good	-	Poor	-	Good	Good
SAR Rating	none	n/v	n/v	Good	Good	-	-	-	Good	-	Good	-	Good	Good
Physical Properties														
Percent Sand	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Percent Silt	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Percent Clay	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Texture	none	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Sieve - Pan	%	n/v	n/v	-	-	24	27	-	-	-	-	-	-	-
Sieve - #200 (>0.075mm)	%	n/v	n/v	-	-	76	73	-	-	-	-	-	-	-
Grain Size	none	n/v	n/v	-	-	COARSE	COARSE	-	-	-	-	-	-	-
See notes on the last page														
Metals														
Antimony	mg/kg	20	n/v	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	12	n/v	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/kg	500	n/v	-	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/kg	4	n/v	-	-	-	-	-	-	-	-	-	-	-
Boron (Available)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/kg	10	n/v	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/kg	64	n/v	-	-	-	-	-	-	-	-	-	-	-
Chromium (Hexavalent)	mg/kg	0.4	n/v	-	-	-	-	-	-	-	-	-	-	-
Cobalt	mg/kg	50	n/v	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/kg	63	n/v	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/kg	140	n/v	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/kg	6.6	n/v	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/kg	10	n/v	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/kg	50	n/v	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/kg	1	n/v	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/kg	20	n/v	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/kg	1	n/v	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/kg	50	n/v	-	-	-	-	-	-	-	-	-	-	-
Uranium	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/kg	130	n/v	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/kg	200	n/v	-	-	-	-	-	-	-	-	-	-	-
BTEX and Petroleum Hydrocarbons														
Benzene	mg/kg	0.5	n/v	<0.044 HN AW	<0.036 HN AW	<0.029 HN	<0.013 HN	<0.019 HN	<0.021 HN	-	<0.0050	-	<0.0050	<0.0050
Toluene	mg/kg	0.8	n/v	<0.17 HN AW	<0.14 HN AW	<0.11 HN	<0.050 HN	<0.074 HN	<0.082 HN	-	<0.020	-	<0.020	<0.020
Ethylbenzene	mg/kg	1.2	n/v	<0.087 HN AW	<0.071 HN AW	<0.057 HN	<0.025 HN	<0.037 HN	<0.041 HN	-	<0.010	-	<0.010	<0.010
Xylene, m & p-	mg/kg	n/v	n/v	<0.35 HN AW	<0.28 HN AW	<0.23 HN	<0.10 HN	<0.15 HN	<0.16 HN	-	<0.040	-	<0.040	<0.040
Xylene, o-	mg/kg	n/v	n/v	<0.17 HN AW	<0.14 HN AW	<0.11 HN	<0.050 HN	<0.074 HN	<0.082 HN	-	<0.020	-	<0.020	<0.020
Xylenes, Total	mg/kg	1	n/v	<0.040 HN AW	<0.040 HN AW	<0.23 HN	<0.10 HN	<0.15 HN	<0.18	-	<0.045	-	<0.045	<0.045
PHC F1 (C6-C10 range)	mg/kg	n/v	n/v	<100 HN AW	<85 HN AW	<57 HN	<25 HN	<37 HN	<41 HN	-	<10	-	<10	<10
PHC F1 (C6-C10 range) minus BTEX	mg/kg	n/v	30L	<12 HN AW	<12 HN AW	***<57 HN***	<25 HN	***<37 HN***	***<41***	-	<10	-	<10	<10
F2 as a Percentage of F2+F3B	mg/kg	n/v	n/v	-	-	-	-	-	6.4	-	NC	-	-	-
PHC F2 (>C10-C16 range)	mg/kg	n/v	150	<63 HM	<53 HM	<37	23 HN	<26	30 HN	-	<10	-	11	<10
PHC F3 (>C16-C34 range)	mg/kg	n/v	400	<310 HM	**670 HM**[B]	200 HN	**420 HN**[B]	390 HN	**440**[B]	-	100	-	100	88
PHC F3a (C16-C22 range)	mg/kg	n/v	n/v	-	-	-	-	-	<140 HN	-	<50	-	-	-
PHC F3b (C22-C34 range)	mg/kg	n/v	n/v	-	-	-	-	-	440 HN	-	100	-	-	-
PHC F4 (>C34) Gravimetric	mg/kg	n/v	2800	-	-	-	-	-	-	-	-	-	-	-
PHC F4 (>C34-C50 range)	mg/kg	n/v	2800	<310 HM	<260 HM	<190	<110	<130	<140 HN	-	<50	-	<50	<50
Chromatogram to baseline at C50	none	n/v	n/v	YES	YES	YES	YES	YES	YES	-	YES	-	YES	YES
Gravimetric Heavy Hydrocarbons	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-
Petroleum Hydrocarbons (F2-F4 Silica-Gel)														
PHC F2 (>C10-C16 range)	mg/kg	n/v	150	-	-	<37 HN	23 HN	<26 HN	-	-	-	-	-	-
PHC F3 (>C16-C34 range)	mg/kg	n/v	400	-	-	200 HN	**420 HN**[B]	390 HN	-	-	-	-	-	-
PHC F4 (>C34-C50 range)	mg/kg	n/v	2800	-	-	<190 HN	<110 HN	<130 HN	-	-	-	-	-	-
Chromatogram to baseline at C50	none	n/v	n/v	-	-	YES	YES	YES	-	-	-	-	-	-
See notes on the last page														

Table C.3
Summary of Soil Analytical Results
Nogha K-14 Wellsite and Sump
MGM Energy Corporation

		NWT		K-14												
				Wallow 2							Wallow 3		Wallow 4			
Sample Location				Wallow-2	Wallow-2	SS3	SS3	SS4	SS4	Wellsite_SS5	Wallow-3	Wellsite_SS3	SS7	SS7	SS8
Sample Date				15-Jul-12	15-Jul-12	24-Aug-16	24-Aug-16	24-Aug-16	24-Aug-16	20-Jul-17	15-Jul-12	20-Jul-17	24-Aug-16	24-Aug-16	24-Aug-16
Sample ID				Wallow 2 0-30	Wallow 2 50-70	K14_SS3_0-0.25	K14_SS3_0.25-0.5	K14_SS4_0-0.25	K14_SS4_0.25-0.5	K14_Wellsite_SS5_0.0-0.25	Wallow 3 30-60	K14_Wellsite_SS3_0.0-0.25	K14_SS7_0-0.25	K14_SS7_0.25-0.5	K14_SS8_0-0.25
Sample Depth				0 - 0.3 m	0.5 - 0.7 m	0 - 0.25 m	0.25 - 0.5 m	0 - 0.25 m	0.25 - 0.5 m	0 - 0.25 m	0.3 - 0.6 m	0 - 0.25 m	0 - 0.25 m	0.25 - 0.5 m	0 - 0.25 m
Sampling Company				PRDDIS	PRDDIS	MGM ENERGY	MGM ENERGY	MGM ENERGY	MGM ENERGY	STANTEC	PRDDIS	STANTEC	MGM ENERGY	MGM ENERGY	MGM ENERGY
Laboratory				AGAT	AGAT	MAXX	MAXX	MAXX	MAXX	MAXX	AGAT	MAXX	MAXX	MAXX	MAXX
Laboratory Work Order				12E621623	12E621623	B674711	B674711	B674711	B674711	B761155	12E621623	B761155	B674711	B674711	B674711
Laboratory Sample ID				3529402	3529404	PK2382	PK2383	PK2384	PK2385	RO7247	3529406	RO7245	PK2573	PK2574	PK2575
Sample Type	**Units**	**Table A.7 A**	**PHCs - Coarse B**												
General Chemistry															
Anion Sum	meq/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/kg	n/v	n/v	665	385	1,300	620	520	820	-	1,400	-	290	630	150
Calcium	mg/L	n/v	n/v	554	664	150	140	92	140	-	602	-	37	100	28
Cation Sum	meq/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Cation/EC Ratio	none	n/v	n/v	-	-	10	9.8	9.3	9.5	-	-	-	6.9	8.3	11
Chloride	mg/kg	n/v	n/v	20	<2	120	50	98	47	-	410	-	76	69	85
Chloride	mg/L	n/v	n/v	17	<5	14	12	17	8.3	-	176	-	9.5	11	16
Ion Balance	none	n/v	n/v	-	-	1.1	0.99	1.1	0.97	-	-	-	1.0	0.97	1.6
Magnesium	mg/kg	n/v	n/v	149	198	380	160	190	220	-	508	-	85	140	51
Magnesium	mg/L	n/v	n/v	124	341	45	36	34	38	-	218	-	11	22	9.7
Moisture Content	%	n/v	n/v	78	-	82	80	79	80	62	62	78	85	81	81
Organic Matter	%	n/v	n/v	-	-	>69	60	66	>69	-	-	-	63	51	>69
Percent Saturation	%	n/v	n/v	120	58	850	430	560	570	-	233	-	800	630	530
Potassium	mg/kg	n/v	n/v	5	12	95	12	36	17	-	12	-	25	27	37
Potassium	mg/L	n/v	n/v	4	20	11	2.7	6.5	2.9	-	5	-	3.1	4.3	7.0
Sodium	mg/kg	n/v	n/v	18	8	38	11	38	29	-	161	-	24	17	32
Sodium	mg/L	n/v	n/v	15	13	4.5	2.5	6.8	5.0	-	69	-	2.9	2.8	6.1
Sodium Adsorption Ratio (SAR)	none	5	n/v	0.15	0.1	<0.10	<0.10	0.15	0.10	-	0.61	-	0.11	<0.10	0.25
Soluble (CaCl2) pH	S.U.	6-8	n/v	**3.26[A]**	7.03	**3.31[A]**	**3.66[A]**	**3.20[A]**	**3.52[A]**	-	**3.63[A]**	-	**4.96[A]**	**5.03[A]**	**3.26[A]**
Soluble Conductivity	dS/m	2	n/v	**3.61[A]**	**4.49[A]**	1.2	1.1	0.91	1.1	-	**3.82[A]**	-	0.42	0.86	0.30
Soluble pH	S.U.	6-8	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	mg/kg	n/v	n/v	-	-	4,500	2,200	2,000	3,000	-	-	-	1,000	2,100	390
Sulfate	mg/L	n/v	n/v	-	-	540	490	360	530	-	-	-	130	340	74
Sulfur (as SO4)	mg/kg	n/v	n/v	3,110	2,380	-	-	-	-	-	5,640	-	-	-	-
Sulfur (as SO4)	mg/L	n/v	n/v	2,590	4,101	-	-	-	-	-	2,420	-	-	-	-
Theoretical Gypsum Requirement	tonnes/ha	n/v	n/v	<0.01	<0.01	<0.20	<0.20	<0.20	<0.20	-	<0.01	-	<0.20	<0.20	<0.20
Total Organic Carbon	%	n/v	n/v	-	-	>40	35	38	>40	-	-	-	36	29	>40
Total Organic Carbon	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
AENV Salinity / Sodicity Rating[C]															
EC Rating	none	n/v	n/v	Fair	Poor	Good	Good	Good	Good	-	Fair	-	Good	Good	Good
SAR Rating	none	n/v	n/v	Good	Good	Good	Good	Good	Good	-	Good	-	Good	Good	Good
Physical Properties															
Percent Sand	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Percent Silt	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Percent Clay	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Texture	none	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
Sieve - Pan	%	n/v	n/v	-	-	-	-	-	-	42	-	29	-	-	-
Sieve - #200 (>0.075mm)	%	n/v	n/v	89	-	-	-	-	-	59	ORG	71	-	-	-
Grain Size	none	n/v	n/v	Coarse	-	-	-	-	-	COARSE	Fine	COARSE	-	-	-

See notes on the last page

Metals															
Antimony	mg/kg	20	n/v	0.5	0.9	-	-	-	-	-	<0.5	-	-	-	-
Arsenic	mg/kg	12	n/v	4	8.1	-	-	-	-	-	2.8	-	-	-	-
Barium	mg/kg	500	n/v	158	99.6	-	-	-	-	-	149	-	-	-	-
Beryllium	mg/kg	4	n/v	<0.5	0.6	-	-	-	-	-	<0.5	-	-	-	-
Boron (Available)	mg/kg	n/v	n/v	9.6	1.2	-	-	-	-	-	9.3	-	-	-	-
Cadmium	mg/kg	10	n/v	0.7	<0.5	-	-	-	-	-	0.7	-	-	-	-
Chromium	mg/kg	64	n/v	12	13.3	-	-	-	-	-	9.5	-	-	-	-
Chromium (Hexavalent)	mg/kg	0.4	n/v	<0.3	<0.3	-	-	-	-	-	<0.3	-	-	-	-
Cobalt	mg/kg	50	n/v	4.5	6.9	-	-	-	-	-	4.7	-	-	-	-
Copper	mg/kg	63	n/v	21.2	18	-	-	-	-	-	14.4	-	-	-	-
Lead	mg/kg	140	n/v	6.7	8.8	-	-	-	-	-	4.9	-	-	-	-
Mercury	mg/kg	6.6	n/v	<0.5	<0.5	-	-	-	-	-	<0.5	-	-	-	-
Molybdenum	mg/kg	10	n/v	3	2.3	-	-	-	-	-	2.6	-	-	-	-
Nickel	mg/kg	50	n/v	15.1	17.9	-	-	-	-	-	12.8	-	-	-	-
Selenium	mg/kg	1	n/v	**2.1[A]**	1	-	-	-	-	-	**1.1[A]**	-	-	-	-
Silver	mg/kg	20	n/v	<0.5	1.9	-	-	-	-	-	<0.5	-	-	-	-
Thallium	mg/kg	1	n/v	<0.5	<0.5	-	-	-	-	-	<0.5	-	-	-	-
Tin	mg/kg	50	n/v	<0.5	0.9	-	-	-	-	-	<0.5	-	-	-	-
Uranium	mg/kg	n/v	n/v	8.8	4.5	-	-	-	-	-	6.2	-	-	-	-
Vanadium	mg/kg	130	n/v	20.4	27.9	-	-	-	-	-	15.3	-	-	-	-
Zinc	mg/kg	200	n/v	147	56	-	-	-	-	-	117	-	-	-	-
BTEX and Petroleum Hydrocarbons															
Benzene	mg/kg	0.5	n/v	<0.005	-	<0.035 HN AW	<0.033 HN AW	<0.033 HN AW	<0.044 HN AW	<0.018 HN	<0.005	<0.037 HN	<0.033 HN	<0.024 HN	<0.027 HN
Toluene	mg/kg	0.8	n/v	<0.05	-	<0.14 HN AW	<0.13 HN AW	<0.13 HN AW	<0.17 HN AW	<0.070 HN	<0.05	<0.15 HN	<0.13 HN	<0.096 HN	0.62 HN
Ethylbenzene	mg/kg	1.2	n/v	<0.01	-	<0.069 HN AW	<0.066 HN AW	<0.065 HN AW	<0.087 HN AW	<0.035 HN	<0.01	<0.073 HN	<0.065 HN	<0.048 HN	<0.053 HN
Xylene, m & p-	mg/kg	n/v	n/v	-	-	<0.28 HN AW	<0.26 HN AW	<0.26 HN AW	<0.35 HN AW	<0.14 HN	-	<0.29 HN	<0.26 HN	<0.19 HN	<0.21 HN
Xylene, o-	mg/kg	n/v	n/v	-	-	<0.14 HN AW	<0.13 HN AW	<0.13 HN AW	<0.17 HN AW	<0.070 HN	-	<0.15 HN	<0.13 HN	<0.096 HN	<0.11 HN
Xylenes, Total	mg/kg	1	n/v	<0.05	-	<0.040 HN AW	<0.040 HN AW	<0.040 HN AW	<0.040 HN AW	<0.14 HN	<0.05	<0.29 HN	<0.26 HN	<0.19 HN	<0.21 HN
PHC F1 (C6-C10 range)	mg/kg	n/v	n/v	<10	-	<83	<79 HN AW	<78 HN AW	<100 HN AW	<35 HN	<10	<73 HN	<78 HN	<58 HN	<64 HN
PHC F1 (C6-C10 range) minus BTEX	mg/kg	n/v	30L	<10	-	<12 HN AW	<12 HN AW	<12 HN AW	<12 HN AW	***<35 HN***	<10	***<73 HN***	***<78 HN***	***<58 HN***	***<64 HN***
F2 as a Percentage of F2+F3B	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
PHC F2 (>C10-C16 range)	mg/kg	n/v	150	57	-	<55 HM	<50 HM	<47 HM	<50 HM	<26	<10	<46	<68 HM	<53 HM	<54 HM
PHC F3 (>C16-C34 range)	mg/kg	n/v	400	**941[B]**	-	**1,200 HM[B]**	**1,000 HM[B]**	**940 HM[B]**	**1,100 HM[B]**	**560 HN[B]**	**1,110[B]**	**1,100 HN[B]**	**770 HM[B]**	**720 HM[B]**	**1,600 HM[B]**
PHC F3a (C16-C22 range)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
PHC F3b (C22-C34 range)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-
PHC F4 (>C34) Gravimetric	mg/kg	n/v	2800	-	-	-	-	-	-	-	-	-	-	-	-
PHC F4 (>C34-C50 range)	mg/kg	n/v	2800	362	-	<280 HM	<250 HM	<240 HM	<250 HM	140 HN	386	460 HN	<340 HM	<270 HM	310 HM
Chromatogram to baseline at C50	none	n/v	n/v	-	-	YES	YES	YES	YES	YES	-	YES	YES	YES	YES
Gravimetric Heavy Hydrocarbons	mg/kg	n/v	n/v	N/A	-	-	-	-	-	-	N/A	-	-	-	-
Petroleum Hydrocarbons (F2-F4 Silica-Gel)															
PHC F2 (>C10-C16 range)	mg/kg	n/v	150	-	-	-	-	-	-	<26 HN	-	<46 HN	-	-	-
PHC F3 (>C16-C34 range)	mg/kg	n/v	400	-	-	-	-	-	-	**560 HN[B]**	-	**1,100 HN[B]**	-	-	-
PHC F4 (>C34-C50 range)	mg/kg	n/v	2800	-	-	-	-	-	-	140 HN	-	460 HN	-	-	-
Chromatogram to baseline at C50	none	n/v	n/v	-	-	-	-	-	-	YES	-	YES	-	-	-

See notes on the last page

Table C.3
Summary of Soil Analytical Results
Nogha K-14 Wellsite and Sump
MGM Energy Corporation

				K-14													
				Wallow 4		Wallow 5											
Sample Location				SS8	Wellsite_SS4	SS5	SS5	SS6	SS6	Wellsite_SS2	SS18-05	SS18-05	SS18-05	SS23-01	SS23-01	SS23-02	SS23-02
Sample Date				24-Aug-16	20-Jul-17	24-Aug-16	24-Aug-16	24-Aug-16	24-Aug-16	20-Jul-17	19-Aug-18	19-Aug-18	19-Aug-18	30-Aug-23	30-Aug-23	30-Aug-23	30-Aug-23
Sample ID				K14_SS8_0.25-0.5	K14_Wellsite_SS4_0.0-0.25	K14_SS5_0-0.25	K14_SS5_0.25-0.5	K14_SS6_0-0.25	K14_SS6_0.25-0.5	K14_Wellsite_SS2_0.0-0.25	K14-SS18-05 0.25 m	K14-SS18-05 0.25 m	K14-SS18-05 0.50 m	K14-SS23-01-01	K14-SS23-01-02	K14-SS23-02-01	K14-SS23-02-02
Sample Depth				0.25 - 0.5 m	0 - 0.25 m	0 - 0.25 m	0.25 - 0.5 m	0 - 0.25 m	0.25 - 0.5 m	0 - 0.25 m	0.25 m	0.25 m	0.5 m	0 - 0.25 m	0.25 - 0.5 m	0 - 0.25 m	0.25 - 0.5 m
Sampling Company				MGM ENERGY	STANTEC	MGM ENERGY	MGM ENERGY	MGM ENERGY	MGM ENERGY	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory				MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	MAXX	BV	BV	BV	BV
Laboratory Work Order				B674711	B761155	B674711	B674711	B674711	B674711	B761155	B872569	B8M5203	B872569	C369183	C369183	C369183	C369183
Laboratory Sample ID				PK2576	RO7246	PK2386	PK2387	PK2571	PK2572	RO7244	UE0942	HPT821	UE0943	BYE631	BYE632	BYE633	BYE634
Sample Type	**Units**	**NWT Table A.7 A**	**NWT PHCs - Coarse B**														
General Chemistry																	
Anion Sum	meq/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	25	8.3	17	12
Boron	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/kg	n/v	n/v	180	-	510	640	340	550	-	540	-	780	110	32	140	96
Calcium	mg/L	n/v	n/v	30	-	92	160	55	150	-	82	-	820	280	91	200	150
Cation Sum	meq/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	26	9.1	18	13
Cation/EC Ratio	none	n/v	n/v	8.4	-	10	9.6	10	9.9	-	11	-	14	13	11	12	12
Chloride	mg/kg	n/v	n/v	110	-	260	240	230	250	-	84	-	<24	<4.1	<4.1	<6.9	<6.5
Chloride	mg/L	n/v	n/v	19	-	47	58	36	67	-	13	-	<25 AS	<10	<10	<10	<10
Ion Balance	none	n/v	n/v	1.1	-	1.1	0.92	1.2	0.94	-	1.3	-	1.4	-	-	-	-
Magnesium	mg/kg	n/v	n/v	38	-	200	210	150	190	-	190	-	330	59	17	65	43
Magnesium	mg/L	n/v	n/v	6.6	-	36	51	24	49	-	29	-	350	150	48	94	67
Moisture Content	%	n/v	n/v	82	75	83	77	80	75	84	81	-	-	-	-	-	-
Organic Matter	%	n/v	n/v	63	-	68	44	>69	59	-	-	-	-	-	-	-	-
Percent Saturation	%	n/v	n/v	580	-	550	410	630	380	-	660	-	95	41	36	69	65
Potassium	mg/kg	n/v	n/v	16	-	65	26	73	29	-	25	-	18	1.0	0.99	1.6	1.1
Potassium	mg/L	n/v	n/v	2.8	-	12	6.4	12	7.5	-	3.8	-	19	2.6	2.8	2.4	1.6
Sodium	mg/kg	n/v	n/v	40	-	180	110	150	140	-	<17	-	3.8	4.7	4.9	6.7	6.2
Sodium	mg/L	n/v	n/v	6.9	-	33	28	23	36	-	<2.5	-	4.0	12	14	9.8	9.6
Sodium Adsorption Ratio (SAR)	none	5	n/v	0.29	-	0.73	0.49	0.66	0.66	-	<0.10	-	<0.10	0.14	0.29	0.14	0.16
Soluble (CaCl2) pH	S.U.	6-8	n/v	**3.68**[A]	-	**3.31**[A]	**3.63**[A]	**3.27**[A]	**3.42**[A]	-	**3.35 HV**[A]	-	**5.48**[B]	6.27	6.85	6.42	6.94
Soluble Conductivity	dS/m	2	n/v	0.31	-	0.96	1.4	0.65	1.4	-	0.66	-	**4.9**[A]	2.0	0.83	1.5	1.1
Soluble pH	S.U.	6-8	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	mg/kg	n/v	n/v	490	-	2,100	2,600	1,300	2,300	-	1,600	-	2,400	500	140	550	370
Sulfate	mg/L	n/v	n/v	84	-	380	630	210	600	-	250	-	2,500 AS	1,200	400	800	580
Sulfur (as SO4)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur (as SO4)	mg/L	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Theoretical Gypsum Requirement	tonnes/ha	n/v	n/v	<0.20	-	<0.20	<0.20	<0.20	<0.20	-	NC	-	<0.20	<0.20	<0.20	<0.20	<0.20
Total Organic Carbon	%	n/v	n/v	36	-	39	25	>40	34	-	-	-	-	-	-	-	-
Total Organic Carbon	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	360,000	-	-	-	-	-
AENV Salinity / Sodicity Rating[C]																	
EC Rating	none	n/v	n/v	Good	-	Good	Good	Good	Good	-	Good	-	Poor	Good	Good	Good	Good
SAR Rating	none	n/v	n/v	Good	-	Good	Good	Good	Good	-	Good	-	Good	Good	Good	Good	Good
Physical Properties																	
Percent Sand	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Percent Silt	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Percent Clay	%	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Texture	none	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sieve - Pan	%	n/v	n/v	-	68	-	-	-	-	24	-	-	-	-	-	-	-
Sieve - #200 (>0.075mm)	%	n/v	n/v	-	32	-	-	-	-	76	-	-	-	-	-	-	-
Grain Size	none	n/v	n/v	-	FINE	-	-	-	-	COARSE	-	-	-	-	-	-	-

See notes on the last page

Metals																	
Antimony	mg/kg	20	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	12	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/kg	500	n/v	-	-	-	-	-	-	-	43	-	-	-	-	-	-
Beryllium	mg/kg	4	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (Available)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/kg	10	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/kg	64	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Hexavalent)	mg/kg	0.4	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	mg/kg	50	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/kg	63	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/kg	140	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/kg	6.6	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/kg	10	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/kg	50	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/kg	1	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/kg	20	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/kg	1	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/kg	50	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/kg	130	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/kg	200	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BTEX and Petroleum Hydrocarbons																	
Benzene	mg/kg	0.5	n/v	<0.026 HN	0.038 HN	0.11 HN	<0.019 HN	<0.022 HN	<0.020 HN	<0.051 HN	<0.040 HN	-	-	-	-	-	-
Toluene	mg/kg	0.8	n/v	0.65 HN	0.38 HN	<0.10 HN	<0.076 HN	<0.088 HN	<0.080 HN	<0.20 HN	<0.16 HN	-	-	-	-	-	-
Ethylbenzene	mg/kg	1.2	n/v	<0.051 HN	<0.053 HN	<0.051 HN	<0.038 HN	<0.044 HN	<0.040 HN	<0.10 HN	<0.080 HN	-	-	-	-	-	-
Xylene, m & p-	mg/kg	n/v	n/v	<0.20 HN	<0.21 HN	<0.20 HN	<0.15 HN	<0.18 HN	<0.16 HN	<0.40 HN	<0.32 HN	-	-	-	-	-	-
Xylene, o-	mg/kg	n/v	n/v	<0.10 HN	<0.11 HN	<0.10 HN	<0.076 HN	<0.088 HN	<0.080 HN	<0.20 HN	<0.16 HN	-	-	-	-	-	-
Xylenes, Total	mg/kg	1	n/v	<0.20 HN	<0.21 HN	<0.20 HN	<0.15 HN	<0.18 HN	<0.16 HN	<0.40 HN	<0.36	-	-	-	-	-	-
PHC F1 (C6-C10 range)	mg/kg	n/v	n/v	<61 HN	<53 HN	<61 HN	<46 HN	<53 HN	<48 HN	<100 HN	<80 HN	-	-	-	-	-	-
PHC F1 (C6-C10 range) minus BTEX	mg/kg	n/v	30L	***<61 HN***	***<53 HN***	***<61 HN***	***<46 HN***	***<53 HN***	***<48 HN***	***<100 HN***	***<80***	-	-	-	-	-	-
F2 as a Percentage of F2+F3B	mg/kg	n/v	n/v	-	-	-	-	-	-	-	2.1	-	-	-	-	-	-
PHC F2 (>C10-C16 range)	mg/kg	n/v	150	<56 HM	41 HN	<59 HM	<43 HM	**180 HM**[B]	**190 HM**[B]	46 WG	<52 HN	-	-	-	-	-	-
PHC F3 (>C16-C34 range)	mg/kg	n/v	400	**900 HM**[B]	**2,400 HN**[B]	**1,400 HM**[B]	**1,600 HM**[B]	**2,100 HM**[B]	**1,600 HM**[B]	**1,500 WG**[B]	**1,200**[B]	-	-	-	-	-	-
PHC F3a (C16-C22 range)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	<260 HN	-	-	-	-	-	-
PHC F3b (C22-C34 range)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	1,200 HN	-	-	-	-	-	-
PHC F4 (>C34) Gravimetric	mg/kg	n/v	2800	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PHC F4 (>C34-C50 range)	mg/kg	n/v	2800	<280 HM	550 HN	<300 HM	300 HM	270 HM	230 HM	290 WG	<260 HN	-	-	-	-	-	-
Chromatogram to baseline at C50	none	n/v	n/v	YES	YES	YES	YES	YES	YES	YES	YES	-	-	-	-	-	-
Gravimetric Heavy Hydrocarbons	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Petroleum Hydrocarbons (F2-F4 Silica-Gel)																	
PHC F2 (>C10-C16 range)	mg/kg	n/v	150	-	41 HN	-	-	-	-	46 WG	-	-	-	-	-	-	-
PHC F3 (>C16-C34 range)	mg/kg	n/v	400	-	**2,400 HN**[B]	-	-	-	-	**1,500 WG**[B]	-	-	-	-	-	-	-
PHC F4 (>C34-C50 range)	mg/kg	n/v	2800	-	550 HN	-	-	-	-	290 WG	-	-	-	-	-	-	-
Chromatogram to baseline at C50	none	n/v	n/v	-	YES	-	-	-	-	YES	-	-	-	-	-	-	-

See notes on the last page

Table C.3
Summary of Soil Analytical Results
Nogha K-14 Wellsite and Sump
MGM Energy Corporation

				K-14							
				Wellsite							
Sample Location											
Sample Date				SS23-03 30-Aug-23	SS23-03 30-Aug-23	SS23-04 30-Aug-23	SS23-04 30-Aug-23	SS23-05 30-Aug-23	SS23-05 30-Aug-23	SS23-06 30-Aug-23	SS23-06 30-Aug-23
Sample ID				K14-SS23-03-01	K14-SS23-03-02	K14-SS23-04-01	K14-SS23-04-02	K14-SS23-05-01	K14-SS23-05-02	K14-SS23-06-01	K14-SS23-06-02
Sample Depth				0 - 0.25 m	0.25 - 0.5 m	0 - 0.25 m	0.25 - 0.5 m	0 - 0.25 m	0.25 - 0.5 m	0 - 0.25 m	0.25 - 0.5 m
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory				BV	BV	BV	BV	BV	BV	BV	BV
Laboratory Work Order		NWT		C369183	C369183	C369183	C369183	C369183	C369183	C369183	C369183
Laboratory Sample ID		Table A.7	PHCs - Coarse	BYE635	BYE636	BYE637	BYE638	BYE639	BYE640	BYE641	BYE642
Sample Type	**Units**	**A**	**B**								
General Chemistry											
Anion Sum	meq/L	n/v	n/v	22	17	36	70	11	25	12	8.9
Boron	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Boron	mg/L	n/v	n/v	-	-	-	-	-	-	-	-
Calcium	mg/kg	n/v	n/v	160	91	660	270	410	180	98	45
Calcium	mg/L	n/v	n/v	270	190	380	540	130	250	140	110
Cation Sum	meq/L	n/v	n/v	24	18	38	72	13	27	13	9.8
Cation/EC Ratio	none	n/v	n/v	12	12	13	16	11	13	12	11
Chloride	mg/kg	n/v	n/v	<5.9	<4.7	<18	<5.1	33	<7.4	13	7.2
Chloride	mg/L	n/v	n/v	<10	<10	<10	<10	11	<10	19	17
Ion Balance	none	n/v	n/v	-	-	-	-	-	-	-	-
Magnesium	mg/kg	n/v	n/v	72	42	380	270	220	130	45	21
Magnesium	mg/L	n/v	n/v	120	90	220	540	70	170	63	48
Moisture Content	%	n/v	n/v	-	-	-	-	-	-	-	-
Organic Matter	%	n/v	n/v	-	-	-	-	-	-	-	-
Percent Saturation	%	n/v	n/v	59	47	180	51	310	74	70	43
Potassium	mg/kg	n/v	n/v	2.6	2.9	28	2.0	42	3.3	1.2	0.62
Potassium	mg/L	n/v	n/v	4.4	6.1	16	3.9	13	4.5	1.7	1.5
Sodium	mg/kg	n/v	n/v	8.1	6.3	27	14	30	10	7.5	5.2
Sodium	mg/L	n/v	n/v	14	13	15	27	9.7	14	11	12
Sodium Adsorption Ratio (SAR)	none	5	n/v	0.18	0.20	0.16	0.20	0.17	0.17	0.19	0.25
Soluble (CaCl2) pH	S.U.	6-8	n/v	6.60	6.86	6.44	6.64	6.56 SRP	7.04	6.80	6.91
Soluble Conductivity	dS/m	2	n/v	2.0	1.5	**2.8[A]**	**4.4[A]**	1.2	**2.1[A]**	1.1	0.90
Soluble pH	S.U.	6-8	n/v	-	-	-	-	-	-	-	-
Sulfate	mg/kg	n/v	n/v	630	380	3,000	1,700	1,700	900	370	170
Sulfate	mg/L	n/v	n/v	1,100	810	1,700	3,300	540	1,200	530	400
Sulfur (as SO4)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Sulfur (as SO4)	mg/L	n/v	n/v	-	-	-	-	-	-	-	-
Theoretical Gypsum Requirement	tonnes/ha	n/v	n/v	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Total Organic Carbon	%	n/v	n/v	-	-	-	-	-	-	-	-
Total Organic Carbon	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
AENV Salinity / Sodicity Rating[C]											
EC Rating	none	n/v	n/v	Good	Good	Fair	Poor	Good	Fair	Good	Good
SAR Rating	none	n/v	n/v	Good	Good	Good	Good	Good	Good	Good	Good
Physical Properties											
Percent Sand	%	n/v	n/v	-	-	-	-	-	-	-	-
Percent Silt	%	n/v	n/v	-	-	-	-	-	-	-	-
Percent Clay	%	n/v	n/v	-	-	-	-	-	-	-	-
Texture	none	n/v	n/v	-	-	-	-	-	-	-	-
Sieve - Pan	%	n/v	n/v	-	-	-	-	-	-	-	-
Sieve - #200 (>0.075mm)	%	n/v	n/v	-	-	-	-	-	-	-	-
Grain Size	none	n/v	n/v	-	-	-	-	-	-	-	-
See notes on the last page											
Metals											
Antimony	mg/kg	20	n/v	-	-	-	-	-	-	-	-
Arsenic	mg/kg	12	n/v	-	-	-	-	-	-	-	-
Barium	mg/kg	500	n/v	-	-	-	-	-	-	-	-
Beryllium	mg/kg	4	n/v	-	-	-	-	-	-	-	-
Boron (Available)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Cadmium	mg/kg	10	n/v	-	-	-	-	-	-	-	-
Chromium	mg/kg	64	n/v	-	-	-	-	-	-	-	-
Chromium (Hexavalent)	mg/kg	0.4	n/v	-	-	-	-	-	-	-	-
Cobalt	mg/kg	50	n/v	-	-	-	-	-	-	-	-
Copper	mg/kg	63	n/v	-	-	-	-	-	-	-	-
Lead	mg/kg	140	n/v	-	-	-	-	-	-	-	-
Mercury	mg/kg	6.6	n/v	-	-	-	-	-	-	-	-
Molybdenum	mg/kg	10	n/v	-	-	-	-	-	-	-	-
Nickel	mg/kg	50	n/v	-	-	-	-	-	-	-	-
Selenium	mg/kg	1	n/v	-	-	-	-	-	-	-	-
Silver	mg/kg	20	n/v	-	-	-	-	-	-	-	-
Thallium	mg/kg	1	n/v	-	-	-	-	-	-	-	-
Tin	mg/kg	50	n/v	-	-	-	-	-	-	-	-
Uranium	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Vanadium	mg/kg	130	n/v	-	-	-	-	-	-	-	-
Zinc	mg/kg	200	n/v	-	-	-	-	-	-	-	-
BTEX and Petroleum Hydrocarbons											
Benzene	mg/kg	0.5	n/v	-	-	-	-	-	-	-	-
Toluene	mg/kg	0.8	n/v	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	1.2	n/v	-	-	-	-	-	-	-	-
Xylene, m & p-	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Xylene, o-	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Xylenes, Total	mg/kg	1	n/v	-	-	-	-	-	-	-	-
PHC F1 (C6-C10 range)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
PHC F1 (C6-C10 range) minus BTEX	mg/kg	n/v	30L	-	-	-	-	-	-	-	-
F2 as a Percentage of F2+F3B	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
PHC F2 (>C10-C16 range)	mg/kg	n/v	150	-	-	-	-	-	-	-	-
PHC F3 (>C16-C34 range)	mg/kg	n/v	400	-	-	-	-	-	-	-	-
PHC F3a (C16-C22 range)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
PHC F3b (C22-C34 range)	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
PHC F4 (>C34) Gravimetric	mg/kg	n/v	2800	-	-	-	-	-	-	-	-
PHC F4 (>C34-C50 range)	mg/kg	n/v	2800	-	-	-	-	-	-	-	-
Chromatogram to baseline at C50	none	n/v	n/v	-	-	-	-	-	-	-	-
Gravimetric Heavy Hydrocarbons	mg/kg	n/v	n/v	-	-	-	-	-	-	-	-
Petroleum Hydrocarbons (F2-F4 Silica-Gel)											
PHC F2 (>C10-C16 range)	mg/kg	n/v	150	-	-	-	-	-	-	-	-
PHC F3 (>C16-C34 range)	mg/kg	n/v	400	-	-	-	-	-	-	-	-
PHC F4 (>C34-C50 range)	mg/kg	n/v	2800	-	-	-	-	-	-	-	-
Chromatogram to baseline at C50	none	n/v	n/v	-	-	-	-	-	-	-	-
See notes on the last page											

Table C.3
Summary of Soil Analytical Results
Nogha K-14 Wellsite and Sump
MGM Energy Corporation

Notes:

NWT-RES — NWT Environmental Guideline for Contaminated Site Remediation, November 2003

[A] — Table A7. Remediation Criteria for other Contaminants in soil - Residential/Parkland

NWT — NWT Environmental Guideline for Contaminated Site Remediation, November 2003

[B] — Table 1. Summary of Tier 1 levels (mg/kg) for PHCs in surface soil, Residential/Parkland, coarse, Surface Soil

[C] — Alberta Environment, Salt Contamination Assessment and Remediation Guidelines. Table 2.2. Soil Quality Guidelines for Unrestricted Land Use - Topsoil

	EC	SAR
Good	<2	<4
Fair	2 to 4	4 to 8
Poor	4 to 8	8 to 12
Hazardous	>8	>12

6.8[A] — Concentration exceeds the indicated standard.

15.2 — Measured concentration did not exceed the indicated standard.

<0.50 — Laboratory reporting limit was greater than the applicable standard.

<0.03 — Analyte was not detected at a concentration greater than the laboratory reporting limit.

n/v — No standard/guideline value.

- — Parameter not analyzed / not available.

[1] — Where applicable, for protection of potable groundwater.

[2] — Assumes contamination near residence with slab-on-grade construction.

AS — Detection limit raised due to sample matrix.

AW — Detection limit raised based on sample weight used for analysis.

CD — Detection limits raised due to dilution to bring analyte within the calibrated range.

DLSW — Detection limit reported based on MDL and sample weight used for analysis.

EC — Detection limit raised due to interferent.

HM — Detection limit raised due to high moisture content.

HN — Detection limit raised due to high moisture content, sample contains => 50 wt% moisture.

HV — Due to high absorbtivity of the sample, the water soil extraction ratio has changed from 2:1 to 10:1

LL — Less then recommended weight used for analysis due to limited sample.

MSE — Matrix spike exceeds acceptance limits due to probable matrix interference.

NA — Not analyzed.

NC — Not calculated.

SK — Texture results may have a higher variability in samples that contain greater than approximately 5% organic matter.

SRP — pH was done on a 10:1 Calcium Chloride to soil ratio due to the matrix of the sample.

WG — Detection limit raised due to high moisture content, sample contains > 50 wt % moisture. Detection limit calculated based on Method Detection Limit (MDL).

WSA — Detection limits raised based on sample weight used for analysis.

RPD — Relative Percent Difference.

61% — RPD exceeds data quality objective of 60%.

nc — RPD is not calculated if one or more values is non detect or if one or more values is less than five times the reportable detection limit.

Reference: 2023 Environmental Site Monitoring Report: Nogha K-14 Wellsite Area and Sump Area

Attachment D Laboratory Report

Your P.O. #: 23SR0083 / W14731
Your Project #: 123514551
Site Location: K-14
Your C.O.C. #: 69635

Attention: Tamara Tiessen

STANTEC CONSULTING LTD
#200, 325- 25TH ST. SE
CALGARY, AB
CANADA T2A 7H8

Report Date: 2023/09/13
Report #: R3394428
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C369183
Received: 2023/09/02, 08:30

Sample Matrix: Soil
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Cation/EC Ratio (1)	3	N/A	2023/09/10		Auto Calc
Cation/EC Ratio (1)	9	N/A	2023/09/12		Auto Calc
Chloride (Soluble) (1)	3	2023/09/10	2023/09/10	AB SOP-00033 / AB SOP-00020	SM 24-4500-Cl-E m
Chloride (Soluble) (1)	9	2023/09/12	2023/09/12	AB SOP-00033 / AB SOP-00020	SM 24-4500-Cl-E m
Conductivity @25C (Soluble) (1)	3	2023/09/10	2023/09/10	AB SOP-00033 / AB SOP-00004	SM 23 2510 B m
Conductivity @25C (Soluble) (1)	9	2023/09/12	2023/09/12	AB SOP-00033 / AB SOP-00004	SM 23 2510 B m
Sum of Cations, Anions (1)	3	N/A	2023/09/10		Auto Calc
Sum of Cations, Anions (1)	9	N/A	2023/09/12		Auto Calc
pH @25C (1:2 Calcium Chloride Extract) (1)	3	2023/09/10	2023/09/10	AB SOP-00033 / AB SOP-00006	SM 24 4500 H+B m
pH @25C (1:2 Calcium Chloride Extract) (1)	9	2023/09/11	2023/09/11	AB SOP-00033 / AB SOP-00006	SM 24 4500 H+B m
Sodium Adsorption Ratio (1)	3	N/A	2023/09/10		Auto Calc
Sodium Adsorption Ratio (1)	9	N/A	2023/09/12		Auto Calc
Soluble Ions (1)	3	2023/09/10	2023/09/10	AB SOP-00033 / AB SOP-00042	EPA 6010d R5 m
Soluble Ions (1)	9	2023/09/12	2023/09/12	AB SOP-00033 / AB SOP-00042	EPA 6010d R5 m
Soluble Paste (1)	3	2023/09/10	2023/09/10	AB SOP-00033	Carter 2nd ed 15.2 m
Soluble Paste (1)	9	2023/09/12	2023/09/12	AB SOP-00033	Carter 2nd ed 15.2 m
Soluble Ions Calculation (1)	3	N/A	2023/09/10		Auto Calc
Soluble Ions Calculation (1)	9	N/A	2023/09/12		Auto Calc
Theoretical Gypsum Requirement (1, 2)	3	N/A	2023/09/10		Auto Calc
Theoretical Gypsum Requirement (1, 2)	9	N/A	2023/09/12		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.

Your P.O. #: 23SR0083 / W14731
Your Project #: 123514551
Site Location: K-14
Your C.O.C. #: 69635

Attention: Tamara Tiessen

STANTEC CONSULTING LTD
#200, 325- 25TH ST. SE
CALGARY, AB
CANADA T2A 7H8

Report Date: 2023/09/13
Report #: R3394428
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C369183
Received: 2023/09/02, 08:30

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.

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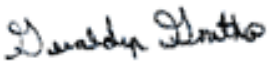
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated 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) TGR calculation is based on a theoretical SAR of 4. Salt Contamination and Assessment and remediation guideline 2001 recommended SAR is ranging 4-8. TGR is reported in tonnes/ha.

Encryption Key



Geraldlyn Gouthro
Key Account Specialist
13 Sep 2023 09:32:21

Please direct all questions regarding this Certificate of Analysis to:
Geraldlyn Gouthro, Key Account Specialist
Email: geraldlyn.gouthro@bureauveritas.com
Phone# (780)577-7173

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Bureau Veritas Job #: C369183
Report Date: 2023/09/13

STANTEC CONSULTING LTD
Client Project #: 123514551
Site Location: K-14
Your P.O. #: 23SR0083 / W14731

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		BYE631		BYE632		BYE633		
Sampling Date		2023/08/30		2023/08/30		2023/08/30		
COC Number		69635		69635		69635		
	UNITS	K14-SS23-01-01	RDL	K14-SS23-01-02	RDL	K14-SS23-02-01	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	25	N/A	8.3	N/A	17	N/A	B094363
Cation Sum	meq/L	26	N/A	9.1	N/A	18	N/A	B094363
Cation/EC Ratio	N/A	13	0.10	11	0.10	12	0.10	B094311
Calculated Calcium (Ca)	mg/kg	110	0.61	32	0.54	140	1.0	B094368
Calculated Magnesium (Mg)	mg/kg	59	0.41	17	0.36	65	0.69	B094368
Calculated Sodium (Na)	mg/kg	4.7	1.0	4.9	0.89	6.7	1.7	B094368
Calculated Potassium (K)	mg/kg	1.0	0.53	0.99	0.46	1.6	0.89	B094368
Calculated Chloride (Cl)	mg/kg	<4.1	4.1	<3.6	3.6	<6.9	6.9	B094368
Calculated Sulphate (SO4)	mg/kg	500	2.0	140	1.8	550	3.4	B094368
Soluble Parameters								
Soluble Chloride (Cl)	mg/L	<10	10	<10	10	<10	10	B104123
Soluble Conductivity	dS/m	2.0	0.020	0.83	0.020	1.5	0.020	B104329
Soluble (CaCl2) pH	pH	6.27	N/A	6.85	N/A	6.42	N/A	B100719
Sodium Adsorption Ratio	N/A	0.14	0.10	0.29	0.10	0.14	0.10	B094366
Soluble Calcium (Ca)	mg/L	280	1.5	91	1.5	200	1.5	B104189
Soluble Magnesium (Mg)	mg/L	150	1.0	48	1.0	94	1.0	B104189
Soluble Sodium (Na)	mg/L	12	2.5	14	2.5	9.8	2.5	B104189
Soluble Potassium (K)	mg/L	2.6	1.3	2.8	1.3	2.4	1.3	B104189
Saturation %	%	41	N/A	36	N/A	69	N/A	B100718
Soluble Sulphate (SO4)	mg/L	1200	5.0	400	5.0	800	5.0	B104189
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	<0.20	0.20	<0.20	0.20	B094373

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas Edmonton: 4326 76 Avenue NW T6B 2H8 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C369183
Report Date: 2023/09/13

STANTEC CONSULTING LTD
Client Project #: 123514551
Site Location: K-14
Your P.O. #: 23SR0083 / W14731

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		BYE634	BYE634			BYE635		
Sampling Date		2023/08/30	2023/08/30			2023/08/30		
COC Number		69635	69635			69635		
	UNITS	K14-SS23-02-02	K14-SS23-02-02 Lab-Dup	RDL	QC Batch	K14-SS23-03-01	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	12	N/A	N/A	B094363	22	N/A	B094363
Cation Sum	meq/L	13	N/A	N/A	B094363	24	N/A	B094363
Cation/EC Ratio	N/A	12	N/A	0.10	B094311	12	0.10	B094311
Calculated Calcium (Ca)	mg/kg	96	N/A	0.97	B094368	160	0.88	B094368
Calculated Magnesium (Mg)	mg/kg	43	N/A	0.65	B094368	72	0.59	B094368
Calculated Sodium (Na)	mg/kg	6.2	N/A	1.6	B094368	8.1	1.5	B094368
Calculated Potassium (K)	mg/kg	1.1	N/A	0.84	B094368	2.6	0.76	B094368
Calculated Chloride (Cl)	mg/kg	<6.5	N/A	6.5	B094368	<5.9	5.9	B094368
Calculated Sulphate (SO4)	mg/kg	370	N/A	3.2	B094368	630	2.9	B094368
Soluble Parameters								
Soluble Chloride (Cl)	mg/L	<10	<10	10	B104123	<10	10	B101782
Soluble Conductivity	dS/m	1.1	1.2	0.020	B104329	2.0	0.020	B101788
Soluble (CaCl2) pH	pH	6.94	6.89	N/A	B100719	6.60	N/A	B101186
Sodium Adsorption Ratio	N/A	0.16	N/A	0.10	B094366	0.18	0.10	B094366
Soluble Calcium (Ca)	mg/L	150	150	1.5	B104189	270	1.5	B101751
Soluble Magnesium (Mg)	mg/L	67	67	1.0	B104189	120	1.0	B101751
Soluble Sodium (Na)	mg/L	9.6	9.2	2.5	B104189	14	2.5	B101751
Soluble Potassium (K)	mg/L	1.6	2.0	1.3	B104189	4.4	1.3	B101751
Saturation %	%	65	66	N/A	B100718	59	N/A	B101184
Soluble Sulphate (SO4)	mg/L	580	570	5.0	B104189	1100	5.0	B101751
Theoretical Gypsum Requirement	tonnes/ha	<0.20	N/A	0.20	B094373	<0.20	0.20	B094373

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

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Bureau Veritas Job #: C369183
Report Date: 2023/09/13

STANTEC CONSULTING LTD
Client Project #: 123514551
Site Location: K-14
Your P.O. #: 23SR0083 / W14731

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		BYE636			BYE637			BYE638		
Sampling Date		2023/08/30			2023/08/30			2023/08/30		
COC Number		69635			69635			69635		
	UNITS	K14-SS23-03-02	RDL	QC Batch	K14-SS23-04-01	RDL	QC Batch	K14-SS23-04-02	RDL	QC Batch
Calculated Parameters										
Anion Sum	meq/L	17	N/A	B094363	36	N/A	B094363	70	N/A	B094363
Cation Sum	meq/L	18	N/A	B094363	38	N/A	B094363	72	N/A	B094363
Cation/EC Ratio	N/A	12	0.10	B094311	13	0.10	B094311	16	0.10	B094311
Calculated Calcium (Ca)	mg/kg	91	0.71	B094368	660	2.6	B094368	270	0.77	B094368
Calculated Magnesium (Mg)	mg/kg	42	0.47	B094368	380	1.8	B094368	270	0.51	B094368
Calculated Sodium (Na)	mg/kg	6.3	1.2	B094368	27	4.4	B094368	14	1.3	B094368
Calculated Potassium (K)	mg/kg	2.9	0.61	B094368	28	2.3	B094368	2.0	0.66	B094368
Calculated Chloride (Cl)	mg/kg	<4.7	4.7	B094368	<18	18	B094368	<5.1	5.1	B094368
Calculated Sulphate (SO4)	mg/kg	380	2.4	B094368	3000	8.8	B094368	1700	2.6	B094368
Soluble Parameters										
Soluble Chloride (Cl)	mg/L	<10	10	B104123	<10	10	B101782	<10	10	B104123
Soluble Conductivity	dS/m	1.5	0.020	B104329	2.8	0.020	B101788	4.4	0.020	B104329
Soluble (CaCl2) pH	pH	6.86	N/A	B100719	6.44	N/A	B101186	6.64	N/A	B100719
Sodium Adsorption Ratio	N/A	0.20	0.10	B094366	0.16	0.10	B094366	0.20	0.10	B094366
Soluble Calcium (Ca)	mg/L	190	1.5	B104189	380	1.5	B101751	540	1.5	B104189
Soluble Magnesium (Mg)	mg/L	90	1.0	B104189	220	1.0	B101751	540	1.0	B104189
Soluble Sodium (Na)	mg/L	13	2.5	B104189	15	2.5	B101751	27	2.5	B104189
Soluble Potassium (K)	mg/L	6.1	1.3	B104189	16	1.3	B101751	3.9	1.3	B104189
Saturation %	%	47	N/A	B100718	180	N/A	B101184	51	N/A	B100718
Soluble Sulphate (SO4)	mg/L	810	5.0	B104189	1700	5.0	B101751	3300	5.0	B104189
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	B094373	<0.20	0.20	B094373	<0.20	0.20	B094373

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas Edmonton: 4326 76 Avenue NW T6B 2H8 Telephone (780)577-7100 Fax (780)450-4187

Bureau Veritas Job #: C369183
Report Date: 2023/09/13

STANTEC CONSULTING LTD
Client Project #: 123514551
Site Location: K-14
Your P.O. #: 23SR0083 / W14731

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		BYE639			BYE640		BYE641		
Sampling Date		2023/08/30			2023/08/30		2023/08/30		
COC Number		69635			69635		69635		
	UNITS	K14-SS23-05-01	RDL	QC Batch	K14-SS23-05-02	RDL	K14-SS23-06-01	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	11	N/A	B094363	25	N/A	12	N/A	B094363
Cation Sum	meq/L	13	N/A	B094363	27	N/A	13	N/A	B094363
Cation/EC Ratio	N/A	11	0.10	B094311	13	0.10	12	0.10	B094311
Calculated Calcium (Ca)	mg/kg	410	4.7	B094368	180	1.1	98	1.1	B094368
Calculated Magnesium (Mg)	mg/kg	220	3.1	B094368	130	0.74	45	0.70	B094368
Calculated Sodium (Na)	mg/kg	30	7.8	B094368	10	1.8	7.5	1.8	B094368
Calculated Potassium (K)	mg/kg	42	4.1	B094368	3.3	0.96	1.2	0.91	B094368
Calculated Chloride (Cl)	mg/kg	33	31	B094368	<7.4	7.4	13	7.0	B094368
Calculated Sulphate (SO4)	mg/kg	1700	16	B094368	900	3.7	370	3.5	B094368
Soluble Parameters									
Soluble Chloride (Cl)	mg/L	11	10	B101782	<10	10	19	10	B104123
Soluble Conductivity	dS/m	1.2	0.020	B101788	2.1	0.020	1.1	0.020	B104329
Soluble (CaCl2) pH	pH	6.56 (1)	N/A	B101186	7.04	N/A	6.80	N/A	B100719
Sodium Adsorption Ratio	N/A	0.17	0.10	B094366	0.17	0.10	0.19	0.10	B094366
Soluble Calcium (Ca)	mg/L	130	1.5	B101751	250	1.5	140	1.5	B104189
Soluble Magnesium (Mg)	mg/L	70	1.0	B101751	170	1.0	63	1.0	B104189
Soluble Sodium (Na)	mg/L	9.7	2.5	B101751	14	2.5	11	2.5	B104189
Soluble Potassium (K)	mg/L	13	1.3	B101751	4.5	1.3	1.7	1.3	B104189
Saturation %	%	310	N/A	B101184	74	N/A	70	N/A	B100718
Soluble Sulphate (SO4)	mg/L	540	5.0	B101751	1200	5.0	530	5.0	B104189
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	B094373	<0.20	0.20	<0.20	0.20	B094373

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) pH was done on a 10:1 Calcium Chloride to soil ratio due to the matrix of the sample.

Bureau Veritas Edmonton: 4326 76 Avenue NW T6B 2H8 Telephone (780)577-7100 Fax (780)450-4187

STANTEC CONSULTING LTD
Client Project #: 123514551
Site Location: K-14
Your P.O. #: 23SR0083 / W14731

SOIL SALINITY 4 (SOIL)

Bureau Veritas ID		BYE642		
Sampling Date		2023/08/30		
COC Number		69635		
	UNITS	K14-SS23-06-02	RDL	QC Batch
Calculated Parameters				
Anion Sum	meq/L	8.9	N/A	B094363
Cation Sum	meq/L	9.8	N/A	B094363
Cation/EC Ratio	N/A	11	0.10	B094311
Calculated Calcium (Ca)	mg/kg	45	0.64	B094368
Calculated Magnesium (Mg)	mg/kg	21	0.43	B094368
Calculated Sodium (Na)	mg/kg	5.2	1.1	B094368
Calculated Potassium (K)	mg/kg	0.62	0.55	B094368
Calculated Chloride (Cl)	mg/kg	7.2	4.3	B094368
Calculated Sulphate (SO4)	mg/kg	170	2.1	B094368
Soluble Parameters				
Soluble Chloride (Cl)	mg/L	17	10	B104123
Soluble Conductivity	dS/m	0.90	0.020	B104329
Soluble (CaCl2) pH	pH	6.91	N/A	B100719
Sodium Adsorption Ratio	N/A	0.25	0.10	B094366
Soluble Calcium (Ca)	mg/L	110	1.5	B104189
Soluble Magnesium (Mg)	mg/L	48	1.0	B104189
Soluble Sodium (Na)	mg/L	12	2.5	B104189
Soluble Potassium (K)	mg/L	1.5	1.3	B104189
Saturation %	%	43	N/A	B100718
Soluble Sulphate (SO4)	mg/L	400	5.0	B104189
Theoretical Gypsum Requirement	tonnes/ha	<0.20	0.20	B094373

RDL = Reportable Detection Limit
N/A = Not Applicable

GENERAL COMMENTS

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

Package 1	4.0°C

Version 2: Sample ID's updated as per cleint request 2029/09/12

Results relate only to the items tested.

Bureau Veritas Edmonton: 4326 76 Avenue NW T6B 2H8 Telephone (780)577-7100 Fax (780)450-4187

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B100718	KVA	QC Standard	Saturation %	2023/09/12		101	%	75 - 125
B100718	KVA	RPD [BYE634-01]	Saturation %	2023/09/12	2.8		%	12
B100718	KVA	RPD	Saturation %	2023/09/12	5.3		%	12
B100719	DPL	QC Standard	Soluble (CaCl2) pH	2023/09/11		101	%	97 - 103
B100719	DPL	Spiked Blank	Soluble (CaCl2) pH	2023/09/11		101	%	97 - 103
B100719	DPL	RPD [BYE634-01]	Soluble (CaCl2) pH	2023/09/11	0.65		%	N/A
B101184	STB	QC Standard	Saturation %	2023/09/10		95	%	75 - 125
B101184	STB	RPD	Saturation %	2023/09/10	3.9		%	12
B101186	STB	QC Standard	Soluble (CaCl2) pH	2023/09/10		100	%	97 - 103
B101186	STB	Spiked Blank	Soluble (CaCl2) pH	2023/09/10		100	%	97 - 103
B101186	STB	RPD	Soluble (CaCl2) pH	2023/09/10	0.21		%	N/A
B101751	VSC	Matrix Spike	Soluble Calcium (Ca)	2023/09/10		97	%	75 - 125
			Soluble Magnesium (Mg)	2023/09/10		99	%	75 - 125
			Soluble Sodium (Na)	2023/09/10		97	%	75 - 125
			Soluble Potassium (K)	2023/09/10		102	%	75 - 125
B101751	VSC	QC Standard	Soluble Calcium (Ca)	2023/09/10		92	%	75 - 125
			Soluble Magnesium (Mg)	2023/09/10		94	%	75 - 125
			Soluble Sodium (Na)	2023/09/10		101	%	75 - 125
			Soluble Potassium (K)	2023/09/10		102	%	75 - 125
			Soluble Sulphate (SO4)	2023/09/10		94	%	75 - 125
B101751	VSC	Spiked Blank	Soluble Calcium (Ca)	2023/09/10		99	%	80 - 120
			Soluble Magnesium (Mg)	2023/09/10		100	%	80 - 120
			Soluble Sodium (Na)	2023/09/10		99	%	80 - 120
			Soluble Potassium (K)	2023/09/10		102	%	80 - 120
B101751	VSC	Method Blank	Soluble Calcium (Ca)	2023/09/10	<1.5		mg/L	
			Soluble Magnesium (Mg)	2023/09/10	<1.0		mg/L	
			Soluble Sodium (Na)	2023/09/10	<2.5		mg/L	
			Soluble Potassium (K)	2023/09/10	<1.3		mg/L	
			Soluble Sulphate (SO4)	2023/09/10	<5.0		mg/L	
B101751	VSC	RPD	Soluble Calcium (Ca)	2023/09/10	2.6		%	30
			Soluble Magnesium (Mg)	2023/09/10	7.0		%	30
			Soluble Sodium (Na)	2023/09/10	0.33		%	30
			Soluble Potassium (K)	2023/09/10	1.9		%	30
			Soluble Sulphate (SO4)	2023/09/10	1.6		%	30
B101782	EBO	Matrix Spike	Soluble Chloride (Cl)	2023/09/10		100	%	75 - 125
B101782	EBO	QC Standard	Soluble Chloride (Cl)	2023/09/10		77	%	75 - 125
B101782	EBO	Spiked Blank	Soluble Chloride (Cl)	2023/09/10		97	%	80 - 120
B101782	EBO	Method Blank	Soluble Chloride (Cl)	2023/09/10	<10		mg/L	
B101782	EBO	RPD	Soluble Chloride (Cl)	2023/09/10	0.33		%	30
B101788	EBO	QC Standard	Soluble Conductivity	2023/09/10		82	%	75 - 125
B101788	EBO	Spiked Blank	Soluble Conductivity	2023/09/10		99	%	90 - 110
B101788	EBO	Method Blank	Soluble Conductivity	2023/09/10	<0.020		dS/m	
B101788	EBO	RPD	Soluble Conductivity	2023/09/10	0.71		%	20
B104123	ZI	Matrix Spike [BYE634-01]	Soluble Chloride (Cl)	2023/09/12		100	%	75 - 125
B104123	ZI	QC Standard	Soluble Chloride (Cl)	2023/09/12		86	%	75 - 125
B104123	ZI	Spiked Blank	Soluble Chloride (Cl)	2023/09/12		101	%	80 - 120
B104123	ZI	Method Blank	Soluble Chloride (Cl)	2023/09/12	<10		mg/L	
B104123	ZI	RPD [BYE634-01]	Soluble Chloride (Cl)	2023/09/12	NC		%	30
B104189	PL	Matrix Spike [BYE634-01]	Soluble Calcium (Ca)	2023/09/12		93	%	75 - 125
			Soluble Magnesium (Mg)	2023/09/12		99	%	75 - 125
			Soluble Sodium (Na)	2023/09/12		100	%	75 - 125
			Soluble Potassium (K)	2023/09/12		96	%	75 - 125
B104189	PL	QC Standard	Soluble Calcium (Ca)	2023/09/12		86	%	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
			Soluble Magnesium (Mg)	2023/09/12		94	%	75 - 125
			Soluble Sodium (Na)	2023/09/12		98	%	75 - 125
			Soluble Potassium (K)	2023/09/12		105	%	75 - 125
			Soluble Sulphate (SO4)	2023/09/12		89	%	75 - 125
B104189	PL	Spiked Blank	Soluble Calcium (Ca)	2023/09/12		94	%	80 - 120
			Soluble Magnesium (Mg)	2023/09/12		99	%	80 - 120
			Soluble Sodium (Na)	2023/09/12		100	%	80 - 120
			Soluble Potassium (K)	2023/09/12		96	%	80 - 120
B104189	PL	Method Blank	Soluble Calcium (Ca)	2023/09/12	<1.5		mg/L	
			Soluble Magnesium (Mg)	2023/09/12	<1.0		mg/L	
			Soluble Sodium (Na)	2023/09/12	<2.5		mg/L	
			Soluble Potassium (K)	2023/09/12	<1.3		mg/L	
			Soluble Sulphate (SO4)	2023/09/12	<5.0		mg/L	
B104189	PL	RPD [BYE634-01]	Soluble Calcium (Ca)	2023/09/12	0.73		%	30
			Soluble Magnesium (Mg)	2023/09/12	0.67		%	30
			Soluble Sodium (Na)	2023/09/12	3.8		%	30
			Soluble Potassium (K)	2023/09/12	18		%	30
			Soluble Sulphate (SO4)	2023/09/12	1.5		%	30
B104329	EBO	QC Standard	Soluble Conductivity	2023/09/12		103	%	75 - 125
B104329	EBO	Spiked Blank	Soluble Conductivity	2023/09/12		98	%	90 - 110
B104329	EBO	Method Blank	Soluble Conductivity	2023/09/12	<0.020		dS/m	
B104329	EBO	RPD [BYE634-01]	Soluble Conductivity	2023/09/12	3.6		%	20

N/A = Not Applicable

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.

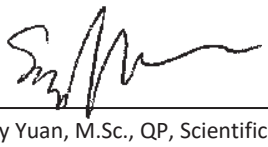
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

Bureau Veritas Edmonton: 4326 76 Avenue NW T6B 2H8 Telephone (780)577-7100 Fax (780)450-4187

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



Sandy Yuan, M.Sc., QP, Scientific Specialist

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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 {0}, {1} responsible for {2} {3} laboratory operations.

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042

Custody Tracking Form

eCOC Number
W69635

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain of Custody). Please ensure your form **has a barcode or a Bureau Veritas eCOC confirmation number** in the top right hand side. This number links your electronic submission to your samples. This form should be **placed in the cooler with your samples**.

Relinquished By				Received By			
		Date		Deji Wu	D	Date	2023/09/02
		Time (24 HR)				Time (24 HR)	08:30
		Date		Shaira Cura		Date	2023/09/03
		Time (24 HR)				Time (24 HR)	09:00
		Date				Date	
		Time (24 HR)				Time (24 HR)	

Unless otherwise agreed to, submissions and use of services are governed by Bureau Veritas' standard terms and conditions which can be found at www.bvna.com.

Triage Information

Sampled By (Print)	# of Coolers/Pkgs	Rush	Immediate Test	Food Residue
		Micro		Food Chemistry

***** Laboratory Use Only *****

Received At: IMED2

Labeled By:

Verified By:

Lab Comments:

mcal-09-226

C3689183

Custody Seal		Cooling Media	Temperature °C		
Present (Y/N)	Intact (Y/N)	Present (Y/N)	1	2	3
N Y	N Y	Y Y	4 5	4 7	4 8

Drinking Water Metals Preservation Check Done (Circle) YES NO

COR FCD-00340 /5
PAGE 1 of 1

eCOC: W69635

Project Information:	C369183
Job Received:	2023/09/02 08:30
Expected TAT:	Standard TAT
Expected Arrival:	2023/09/01
Submitted By:	James Hymers
Submitted To:	Edmonton ENV:4326 76 Avenue NW

Invoice Information

Attn: Ian Keir c/o Stantec
MGM ENERGY
2800, 421 - 7 Avenue SW
Calgary , AB , T2P 4K9
Email to:
tamara.tiessen@stantec.com

Report Information

Attn: James Hymers
STANTEC CONSULTING LTD
#200, 325- 25TH ST. SE
CALGARY , AB , T2A 7H8
Email to:
tamara.tiessen@stantec.com
james.hymers@stantec.com

Project Information

Quote #:	C30475
PO/AFE#:	23SR0083 / W14731
Project #:	123514551
Site Location:	K-14

Analytical Summary

A: Standard TAT
M: Manually added test

Client Sample ID	Clnt Ref	Sampling Date/Time	Matrix	#Cont	SOIL SALINITY 4	Hold
K14-SS23-01-01 (0.0-0.25 m)	1	2023/08/30	SOIL	1	A	
K14-SS23-01-02 (0.25-0.5 m)	2	2023/08/30	SOIL	1	A	
K14-SS23-02-01 (0.0-0.25 m)	3	2023/08/30	SOIL	1	A	
K14-SS23-02-02 (0.25-0.5 m)	4	2023/08/30	SOIL	1	A	
K14-SS23-03-01 (0.0-0.25 m)	5	2023/08/30	SOIL	1	A	
K14-SS23-03-02 (0.25-0.5 m)	6	2023/08/30	SOIL	1	A	
K14-SS23-04-01 (0.0-0.25 m)	7	2023/08/30	SOIL	1	A	
K14-SS23-04-02 (0.25-0.5 m)	8	2023/08/30	SOIL	1	A	
K14-SS23-05-01 (0.0-0.25 m)	9	2023/08/30	SOIL	1	A	
K14-SS23-05-02 (0.25-0.5 m)	10	2023/08/30	SOIL	1	A	
K14-SS23-06-01 (0.0-0.25 m)	11	2023/08/30	SOIL	1	A	
K14-SS23-06-02 (0.25-0.5 m)	12	2023/08/30	SOIL	1	A	
K14-SS23-01-03 (0.5-0.75 m)	13	2023/08/30	SOIL	1		M

Deadlines are estimates only and are subject to change. Please refer to your Job Confirmation report for final due dates.

Submission Information

# of Samples: 13