

# Memo

. sTo:	MGM Energy	From:	James Hymers, Project Manager K'alo-Stantec Ltd.
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File:	123514551	Date:	January 22, 2024

#### Reference: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area

The Nogha M-17 Wellsite Area (the Site) is located in the Sahtu Settlement Area (SSA), Northwest Territories (NT), approximately 156 kilometres (km) north of Norman Wells (Attachment A: Figure A.1). The Site is approximately 1.4 hectares (ha) in size and includes a wellhead, Central Bare Area, two shallow ditches, and two wallow areas (Wellsite Area) (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.8. Information for the Site and the general work completed in 2023 is provided in Table 1, below.

Site	Nogha M-17 Wellsite	Coordinates	66° 36' 45.720" N and 125° 48' 38.039" 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, I	B.Sc.	Monitoring Date	August 29, 2023	
Type of Inspection	<ul><li>☐ Ground</li><li>⊠ Aerial</li></ul>	Current Stage of Remediation/ Reclamation	⊠ In progress □ Planned □ Complete	Locations Inspected	<ul><li>☑ Well Site</li><li>□ Sump</li><li>□ Staging Area</li></ul>
Summary of Ongoing Work Completed to Date	<ul> <li>Decommission</li> <li>Erosion Corrist</li> <li>Excavation/</li> <li>Phytoremed</li> <li>Seeded</li> <li>Planted</li> <li>Other</li> </ul>	ioning htrol Capping liation	Key Issues	<ul> <li>No issues</li> <li>On-Site Materials</li> <li>Wastes/Spills</li> <li>Erosion</li> <li>Terrain Conditions</li> <li>Soil Exceedances</li> <li>Water Exceedances</li> <li>Vegetation</li> <li>Wildlife Signs</li> </ul>	<ul> <li>Recommended for:</li> <li>□ Closure</li> <li>□ No further environmental monitoring or remediation/ reclamation treatments until closure</li> <li>☑ Additional monitoring only</li> <li>□ Additional treatment and monitoring (see Table 3)</li> </ul>

## Table 1 2023 Site Specifications

#### Reference: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area

## 1 Key Findings and Recommendations

In 2023, an aerial reconnaissance of the Wellsite Area was conducted. Upon arrival, the field team visually assessed the Site and took photographs (Attachment B) to document site conditions as the helicopter circled above the Wellsite Area.

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
On-Site Materials	Aª
Erosion Control/Drainage	A
Terrain Conditions	A
Soil	IP
Standing Water	IP
Vegetation Cover	IP
Invasive Plants/Weeds	A
Wildlife Signs of Use	IP

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<sup>1</sup>
- Soils at or below Government of Northwest Territories (GNWT) Environmental Quality Guidelines<sup>2</sup> and Alberta Environment, Salt Contamination Assessment and Remediation Guidelines<sup>3</sup>.
- 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

<sup>a</sup> 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.

<sup>&</sup>lt;sup>3</sup> Alberta Environment. 2001. *Salt Contamination Assessment and Remediation Guidelines*. Table 2.2. Soil Quality Guidelines for Unrestricted Land Use – Topsoil.



<sup>&</sup>lt;sup>1</sup> CCME, 2023. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health. Available from <u>http://ceqg-rcqe.ccme.ca/</u>. Last checked in May 2023

<sup>&</sup>lt;sup>2</sup> Government of Northwest Territories (GNWT). 2003. *Environmental Guideline for Contaminated Site Remediation*. November 2003.

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Reference: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area

		Soil and Water Analytical Results	
Parameters	Monitoring Observations and Results	(if exceedances)	Future Recommended Work
On-Site Materials	<ul> <li>Wellhead and protective culvert were the only structures observed at the time of the site visit (Attachment B: Photo B.3).</li> <li>No other surface structures, materials, or waste were observed within the remainder of the Site during the site visit.</li> </ul>	Not applicable for this parameter.	<ul> <li>No further work related to on-site materials is recommended until the wellhead is cut, capped, and abandoned.</li> </ul>
Terrain	<ul> <li>No erosion issues were observed at the Site during the site visit.</li> <li>No terrain stability concerns were observed at the Site during the site visit. Terrain conditions were observed to be stable.</li> </ul>	Not applicable for this parameter.	<ul> <li>Continue visual monitoring for potential signs of stress and/or ground movement.</li> </ul>
Standing Water	<ul> <li>No standing water was sampled during the site visit.</li> <li>Standing water was observed in the west end of the Site along the lease boundary (Attachment B: Photo B.4). Unlike previous site visits, most of the pond areas at the west end of the Site were dry at the time of the 2023 site visit.</li> </ul>	• Water samples were not collected in this area during the 2023 site visit.	<ul> <li>Standing water sample collection at the wellhead and Central Bare Area, if present, to determine if there are any potential salinity exceedances originating from the wellhead to correlate with the soil data (M17-SS19-01<sup>4</sup>).</li> </ul>
Soils	<ul> <li>Soil was not sampled during the 2023 site visit.</li> <li>Previous samples collected in 2019 from Wallows 1, 2 and 3 reported petroleum hydrocarbon (PHC) exceedances. However, the exceedances were reported to be attributed to high organic matter (peat) interference based on the F3a/b fractionation and field observations of high organic matter and lack of petrogenic observations (i.e., odour and/or staining). As a result, further investigation pertaining to the PHC exceedances was not recommended <sup>5</sup>.</li> </ul>	• Soil samples were not collected in this area during the 2023 site visit.	• Soil sample collection to support vegetation reclamation may be required where vegetation is affected by elevated EC and SAR. Sampling to be completed after amendment application once well is abandoned. Samples should be submitted for detailed salinity.

## Table 32023 Summary of Key Findings and Recommendations

<sup>&</sup>lt;sup>5</sup> Kãlo Stantec, 2023. MGM Energy - 2022 Environmental Site Monitoring Report: Nogha M-17 Wellsite. Prepared for MGM Energy.



<sup>&</sup>lt;sup>4</sup> Kãlo Stantec, 2019. MGM Energy - 2019 Environmental Site Monitoring Report: Nogha M-17 Wellsite. Prepared for MGM Energy, Project No. 123513162.

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Parameters	Monitoring Observations and Results	Soil and Water Analytical Results (if exceedances)	Future Recommended Work
Soils (cont'd)	• Previous samples collected in 2019 and 2022 reported elevated electrical conductivity (EC) and sodium adsorption ratio (SAR) due to elevated concentrations of chloride, sodium, and/or sulphate <sup>4,5</sup> .	See above	See above
Vegetation	<ul> <li>Vegetation cover on most of the Site, except muskox impacted portions of the Central Bare Area and Wallows 1 to 3, met the land use permit requirements (i.e., &gt;70% vegetation cover and in healthy condition at the time of the site visit) (Attachment A: Figure A.3; Attachment B: Photo B.2 and Photo B.5).</li> <li>No invasive plants/weeds were observed within the Wellsite Area during the site visit. Shallow Ditches (Attachment A: Figure A.3):</li> <li>Revegetated with seeded grasses and naturally established shrubs and forbs (Attachment B: Photo B.5).</li> <li>Vegetation cover met permit requirements (i.e., &gt;70% vegetation cover and healthy condition).</li> <li>Central Bare Area (Attachment A: Figure A.3):</li> <li>Central Bare Area underwent reclamation treatments in 2017 to increase vegetation cover. Certain sections of the area were then heavily grazed, ground compacted and made bare due to heavy use by muskox (Ovibos moschatus).</li> <li>Vegetation cover ranged from approximately 40% to 75% cover, consisting predominantly of seeded native grasses and minor amounts of naturally established forbs and shrubs. Vegetation was heavily grazed (66% to 80% of plants grazed) and the ground was heavily trampled and compacted by ungulates (most likely muskox) hoof traffic (Attachment B: Photo B.2, Photo B.5, and Photo B.6).</li> <li>Overall, vegetation in this area was not meeting permit requirements for percent cover and health condition (i.e., had &lt;70% cover and in unhealthy condition).</li> </ul>	Not applicable for this parameter.	<ul> <li>Reconnaissance level vegetation monitoring for the majority of the Wellsite Area.</li> <li>Conduct detailed vegetation monitoring in the Central Bare Area/wallows to assess vegetation reestablishment and to guide soil chemistry monitoring and amendment treatments.</li> <li>Carry out detailed vegetation monitoring at the proposed standing water and soil sampling locations.</li> <li>Due to heavy muskox use on the Site, no further reclamation treatments recommended on the Central Bare Area unless fencing, or deterrent structures/coarse woody debris can be installed to effectively protect treated areas from muskox damage.</li> <li>No further reclamation treatments around the wellhead recommended until the wellhead is cut, capped, and abandoned.</li> </ul>



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Reference: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area

Parameters	Monitoring Observations and Results	Soil and Water Analytical Results (if exceedances)	Future Recommended Work
Vegetation (cont'd)	<ul> <li>Wallow 1 (Attachment A: Figure A.3):</li> <li>Wallow contained standing water at the time of the site visit and no vegetation was visible. Ground surface</li> </ul>	See above	<ul> <li>Reconnaissance level monitoring for invasive plants when a site visit is carried out.</li> </ul>
	around flooded wallow did not appear trampled or compacted by ungulate hoof traffic (Attachment B: Photo B.2 and Photo B.8)		<ul> <li>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.</li> </ul>
	<ul> <li>Vegetation in this area was not meeting the permit requirements for percent cover and health condition (i.e., had &lt;70% cover and in unhealthy condition).</li> </ul>		
	Wallow 2 (Attachment A, Figure A.3):		
	• Vegetation cover ranged from approximately 0% to 5% cover. Ground material consisted of soft peat and organic material which appeared trampled or compacted by ungulate hoof traffic or wallowing (Attachment B: Photo B.2 and Photo B.8).		
	<ul> <li>Vegetation in this area was not meeting the permit requirements for percent cover and health condition (i.e., had &lt;70% cover and in unhealthy condition).</li> </ul>		
	Wallow 3 (Attachment A, Figure A.3):		
	<ul> <li>Vegetation cover was approximately 35% cover. Ground material consisted of soft peat and organic material which appeared trampled or compacted by ungulate hoof traffic or wallowing (Attachment B: Photo B.2 and Photo B.8).</li> </ul>		
	<ul> <li>Vegetation in this area was not meeting the permit requirements for percent cover and health condition (i.e., had &lt;70% cover and in unhealthy condition).</li> </ul>		



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Reference: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area

Parameters	Monitoring Observations and Results	Soil and Water Analytical Results (if exceedances)	Future Recommended Work
Wildlife Signs	• Muskox, or other ungulates, had heavily used standing water at the west end of the Site as evidenced by numerous hoof prints observed in the muddy soil adjacent to the water (Attachment B: Photo B.7).	<ul> <li>Not applicable for this parameter.</li> </ul>	• Due to heavy muskox use on the Site, no further reclamation treatments recommended on the Central Bare Area unless fencing, or deterrent structures/coarse woody debris can be installed to effectively protect treated areas from muskox damage.
	<ul> <li>Wallows 1 to 3 were still present at the time of the site visit and continued to be used by ungulates (most likely muskox) (Attachment B: Photo B.8).</li> </ul>		
	<ul> <li>No other wildlife signs of use observed within the Site during the site visit.</li> </ul>		<ul> <li>Continue monitoring for wildlife use at the Site.</li> </ul>



Reference: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area

## 2 Limitations and Closure

This document entitled 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite 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 M-17 Wellsite 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 **Olivier Piraux,** M.Sc. Terrain Scientist

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



#### Reference: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area

This report was reviewed and approved for transmittal by:

**Lindsay van Noortwyk**, P.Geo. Environmental Geoscientist **David Alberti**, M.Sc, P.Geol., MBA Principle, Senior Hydrogeologist

#### Attachments: Attachment A: Figures

Figure A.1MGM Energy Wellsite, Sump, and Staging Area Locations within the Sahtu<br/>Settlement AreaFigure A.2Nogha M-17 Wellsite Area – Soil Sample LocationsFigure A.3Nogha M-17 Wellsite Area – Reclamation AssessmentAttachment B: Site Photographs



Reference: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area

Attachment A Figures





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 $\mathbf{AK}$ 

Project Location

YT

BC

NT

AB

- $\bigcirc$ Historical Soil Sample
  - $\otimes$ Wallow
  - Wellhead
  - Central Bare Area
  - Shallow Ditch
  - Wellsite Area

MB

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Prepared by NFORRESTER on 20231122 QR by LVANNOORTWYK on 20231217 IR by DALBERTI on 20231218 Project Location Sahtu Settlement Area NT Client/Project Client: MGM Energy 123514551 Project: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area Figure No. A.2 Title Nogha M-17 Wellsite Area - Soil Sample Locations



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Reference: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area

Attachment B

Site Photographs



Reference: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area

## Photo B.1 M-17 Wellsite Area: Overview



Note: West facing overview of the Wellsite Area and surrounding area showing overall terrain, water, and vegetation conditions (August 29, 2023).



Reference: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area

## Photo B.2 M-17 Wellsite Area: Overview



Note: North facing view showing the Wellsite Area, Wellhead, Central Bare Area, Wallow 1, Wallow 2, Wallow 3, and Shallow Ditches (August 29, 2023).



Reference: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area

## Photo B.3 M-17 Wellsite Area: On-Site Materials



Note: North facing view of on-site materials showing wellhead, sign, and protective culvert (August 29, 2023).



Reference: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area

## Photo B.4 M-17 Wellsite Area: Standing Water - west end of lease area



Note: Northeast facing view of standing water areas on the west end of the Wellsite Area (August 29, 2023). Unlike previous site visits, most of the areas did not contain water at the time of the 2023 site visit.



Reference: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area

### Photo B.5 M-17 Wellsite Area: Vegetation Cover - Wellsite Area



Note: Northwest facing view of ground and vegetation conditions in the Wellsite Area. Outer edges of the Wellsite Area had revegetated with seeded grasses and naturally established tree, shrub, and forb species and continued to meet permit conditions (i.e., >70% cover and healthy condition) (August 29, 2023).



Reference: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area



#### Photo B.6 M-17 Wellsite Area: Vegetation Cover - Central Bare Area

Note: Northeast facing view of Central Bare Area (August 29, 2023). Area underwent reclamation treatments in July 2017. Vegetation cover ranged from approximately 40% to 75% cover. In some sections, vegetation was heavily grazed by ungulates (most likely muskox) (66% to 80% of plants grazed) and ground was heavily trampled and compacted by hoof traffic. Note ungulate hoof prints in the muddy ground. Overall, vegetation cover was not meeting permit requirements (i.e., had <70% cover and in unhealthy condition).



Reference: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area

Photo B.7 M-17 Wellsite Area: Wildlife Signs - standing water areas



Note: Northeast facing view of standing water areas located on the west end of the Wellsite Area. Muskox heavily used standing water at the west end of the Site as evidenced by numerous hoof prints in muddy soil (August 29, 2023).



Reference: 2023 Environmental Site Monitoring Report: Nogha M-17 Wellsite Area



#### Photo B.8 M-17 Wellsite Area: Wildlife Signs - Wallows



Note: North facing view of Wallows 1, 2, and 3 located on the west end of the Wellsite Area. Wallows were still present and continued to be used by ungulates (most likely muskox) (August 29, 2023).

