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NORTHWEST TERRITORIES WATER BOARD

WATER LICENCE APPLICATION QUESTIONNAIRE

FOR

OIL AND GAS EXPLORATION: DRILLING



prepared by

Department of Indian Affairs and Northern Development
 Water Resources Division
 August 2002

INTRODUCTION

The purpose of this questionnaire is to solicit supplemental information from an applicant to support their application for a Water Licence (or renewal). It is anticipated that the completion of this questionnaire will reduce delays arising from the Northwest Territories Water Board having to solicit additional information after an application has been submitted. This information will be used during the environmental assessment and screening of your application, which must be undertaken prior to the approval of a Water Licence.

The applicant should complete the questionnaire to the best of their ability, recognizing that some questions may not be relevant to the proposed project. For questions that do not relate to the operation, the applicant is requested to indicate "N/A" (not applicable). For information from other sources, please fully reference the material cited, including the title of the document and the page numbers referred to.

If any questions arise while completing the questionnaire, the applicant may wish to contact the Northwest Territories Water Board at (867) 669-2772. If your question is of a technical nature, please contact the Policy and Assessment Section of the Water Resources Division, Department of Indian Affairs and Northern Development (DIAND) at (867) 669-2658.

Chairman
Northwest Territories Water Board

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SECTION 1: APPLICANT INFORMATION

1.1 Applicant: MGM Energy Corp.

Address: Suite 4100 350 7th Avenue SW

Calgary, AB T2P 3N9

Canada

1.2 Project Name: MGM Energy Corp. Cuttings and Fluid Injection (CFI) Facility at Aput C-43: Winter 2008-2011

Property Name:

Exploration Licence Number: EL 427

Closest Community (s): Tuktoyaktuk

Min/Max Latitude of Project Area: 69° 2' 02.5" N

Min/Max Longitude of Project Area: 135° 41' 48.6" W

1.3 Primary Company Contact: Glenn Miller

Title: General Manager, Regulatory & Community Affairs

Contact Number: 403-781-7832

Alternate Contact Numbers: 403-781-7800

Fax: 403-781-7801

1.4 Field Contact: To be determined

Title:

Contact Number:

Alternate Contact Numbers:

Fax:

1.5 List the contractors (ie. Major, sewage, water) that will be involved in the project:

Company Name:

To be determined

Primary Contact:

Title:

Contact Number:

Alternate Contact Numbers:

Fax:

1.6 List all other permits or authorizations applied for:

An Approval from the Environmental Impact Screening Committee (EISC)

Land Use Permit from Indian and Northern Affairs Canada (INAC)

Authorization(s) to Alter Condition of a Well, from the National Energy Board (NEB)

Authorization for Waste Water/Sewage Disposal (Town of Inuvik)

A Highway Access Permit from the Department of Transportation (DOT)

Canada Benefits Plan from Indian and Northern Affairs Canada (INAC)

SECTION 2: PRE-SITE ASSESSMENT

2.1 Please complete the following chart for those items that currently exist in the project area - a snapshot of the area before your project commences. Attach a map depicting all of the indicated items in the project area, as well as the surface drainage patterns and elevation contours.

Please, see the MGM Energy Corp. Cutting and Fluid Injection (CFI) Facility at C-43: Winter 2008-2011 Project Description (hereafter referred to as the "Project Description") for detailed site assessment. Figure 4-1 of the Project Description provides an overview of the Project area.

SECTION 2: PRE-SITE ASSESSMENT (Continued from previous page)

Description

A. Area under consideration for well sites as per PD	Yes <input checked="" type="checkbox"/>	latitude: 69° 2' 02.5" N	Ellice Island
B. waste dumps	No <input type="checkbox"/>	longitude: 135° 41' 48.6" W	Ellice Island
C. fuel and chemical storage areas	Yes <input type="checkbox"/>	latitude:	
	No <input checked="" type="checkbox"/>	longitude:	
	Yes <input checked="" type="checkbox"/>	latitude:	Fuel will be stored in tanks (15,000 or 30,000 L), with built-in or constructed secondary containment
D. sump areas	No	longitude:	
	Yes <input type="checkbox"/>	latitude:	
	No <input checked="" type="checkbox"/>	longitude:	
E. wastewater discharge locations	Yes <input checked="" type="checkbox"/>	latitude: 69° 2' 02.5" N	Site specific location to be confirmed upon completion of CFI facility construction and operations setup
	No <input type="checkbox"/>	longitude: 135° 41' 48.6" W	

F. camps	Yes <input checked="" type="checkbox"/>	latitude: 69° 2' 02.5" N	The camp will be located at, or immediately adjacent to, the Cuttings and Fluid Injection (CFI) facility, and will be approximately 2 ha. The camp will accommodate up to 40 people. Once the CFI facility is operational, personnel may be accommodated at the CFI facility site or at a camp associated with the drilling/completion operations, leaving office & survival shacks at the CFI facility.
	No <input type="checkbox"/>	longitude: 135° 41' 48.6" W	
G. transportation routes	Yes <input type="checkbox"/>	latitude:	
	No <input checked="" type="checkbox"/>	longitude:	
H. pings	Yes <input type="checkbox"/>	latitude:	
	No <input checked="" type="checkbox"/>	longitude:	
I. staging areas	Yes <input checked="" type="checkbox"/>	latitude:	Final barge landing and staging locations to be confirmed after Summer Field Reconnaissance
	No <input type="checkbox"/>	longitude:	
J. seismic lines	Yes <input type="checkbox"/>	latitude:	
	No <input checked="" type="checkbox"/>	longitude:	
K. parks and/or protected areas	Yes <input type="checkbox"/>	latitude:	
	No <input checked="" type="checkbox"/>	longitude:	
L. wildlife management areas	Yes <input checked="" type="checkbox"/>	latitude:	See Table 9 -1 of Section 9 of the Project Description.

M. bird sanctuaries	No <input type="checkbox"/>	longitude:	
	Yes <input type="checkbox"/>	latitude:	
N. trap lines	No <input checked="" type="checkbox"/>	longitude	
	Yes <input type="checkbox"/>	latitude:	
O. other	No <input checked="" type="checkbox"/>	longitude	
	Yes <input type="checkbox"/>	latitude:	
	No <input checked="" type="checkbox"/>	longitude:	

SECTION 3: WATER USE AND WASTE DISPOSAL

3.1 Water Use

Maximum quantity per day (m³):	1500 m ³ daily maximum
Total quantity for project (m³):	54,000 m ³ for one drilling season
Planned uses of water:	Ice pad construction; construction camp; CFI facility camp; CFI facility operations
Operating capacity of the pump:	To be determined
Size of intake screen:	All water intakes will be screened according to <i>DFO Guideline</i> (DFO 1995) to prevent the entrainment of fish
Source of potable water:	Water withdrawals from Mackenzie River, associated channels, and other suitable waterbodies will be required for the construction of ice pads, camp use and make-up water for the CFI facility operations. Potable water will be treated onsite, or supplied from the Town of Inuvik for domestic use in the camp(s). Bottled water may also be provided for consumption purposes.

3.1.2 Please provide information for each water source as required by the Department of Fisheries and Oceans: "Protocol for Water Withdrawal for Oil & Gas Activities in the Northwest Territories".

Water withdrawals from Mackenzie River, associated channels, and other suitable waterbodies will be required for the construction of ice pads, camp use and make-up water for CFI Facility operations. Fish screens meeting Department of Fisheries and Oceans Canada (DFO) guidelines (DFO 1995) will be used on all suction hoses. Potable water will be treated on site, or supplied from the Town of Inuvik for domestic use in the camp(s). Bottled water may also be provided for consumption purposes.

See Section 5.5 of the attached Project Description for details.

3.2 Waste Disposal

3.2.1 Will a camp(s) be provided? Yes ☒ No ☐

If yes, indicate the maximum number of people that will be accommodated

Capacity:	Up to 40 personnel may be required during the construction & installation of the CFI facility.
Maximum Accommodated:	See above

3.2.2 Will the camp remain in one place for the duration of the project, or move around? Please describe the camp type (e.g. sleigh camp) and attach diagrams of the proposed layout.

The camp will accommodate up to 40 people. Once the CFI facility is operational, personnel may be accommodated at the CFI facility site or at a camp associated with the drilling/completion operations, leaving office & survival shacks at the CFI facility.

3.2.3 What is the proposed method of sewage and greywater treatment/disposal?

Wastewater, including grey water and sewage, will be processed by the on site wastewater treatment system. It is expected that the camp will be outfitted with a membrane filtration wastewater system as used successfully during MGM's 2007-2008 drilling program. Incinoleet toilets (waste incinerator toilets) may be used if supplied with the camp.

Treated wastewater that meets the discharge limits set out in the Terms and Conditions of the Water Licence may be used as make-up water with the injection slurry preparation.

Please describe the treatment process.

Sewage is collected in above ground transfer stations and moved into a holding tank. There it is pumped to the treatment system and settling occurs in Primary Settling Tank #1. Oxygen is injected to this tank to begin the aeration process and eliminate any odours from the effluent. The sewage then runs to Settling Tank #2 where grease and most all solids separate. Gravity allows effluent flow from tank #2 through a fine screen to the flow equalization tank. Floats monitor the fluid level in this tank and a pump moves the fluid to the Anoxic tank. It is here where the aeration process is performed and the BOD5 is reduced to as little as possible. Floats again monitor the level of this tank, and it is finally pumped to the membrane tank.

The membrane tank is where the final touches are put on the discharged effluent. In this tank the TSS is built up between 10,000 & 20,000mg/l. This thick "chocolate shake" looking liquor contains the bacteria and all Coli-forms from the sewage and treatment process. The bacteria are moved back into the Anoxic tank to continue consuming the sewage. The membrane which is best compared to a Reverse Osmosis filter is fine enough to remove virtually all suspended solids, Fecal & Total Coli-forms, and some discoloration.

This process is done by means of a vacuum pump sucking the effluent through the membrane. Turbulent air is pumped across the bottom of the membrane which eliminates any plugging off of the pores on the surface.

When the effluent is being discharged it travels through a flow totalizer and volumes are sent back to the PLC (Pro-logic Controller) to continue calculating daily flow. The PLC organizes and monitors all pump & compressor running times.

During the 2007-08 operating season, ultraviolet light (UV) units were added as part of an ongoing effort to improve the system and the effluent discharge.

What is the maximum capacity per day (in m³ and people) of the treatment system?

The camp and associated treatment system has not yet been retained.

Please attach a diagram(s) of the treatment system labeling all of the major components.

See Appendix B of Project Description

3.2.4 Describe the manner in which the treated effluent will be disposed/discharged to the environment:

Wastewater, including grey water and sewage, will be processed by the on-site sewage treatment system provided with the camp. Once water quality discharge criteria have been met, treated effluent may be either used as makeup water for slurry and injection process, and/or released to land and spread on ice roads/pad, as directed by INAC Land Use Inspectors or the Project Water Licence,. MGM will follow all terms and conditions for release as outlined in the Project's Water License and Land Use Permit.

3.2.5 What other back-up methods are available for sewage and greywater treatment/disposal (i.e. contingency)?

In the event the treatment system does not meet expected licensed performance (discharge) criteria, effluent will be (1) hauled by vacuum tank truck to the municipal treatment facility in Inuvik (MGM to obtain appropriate authorization from the Town of Inuvik); or (2) taken to the drill camp sewage treatment plant for further treatment and disposal; or (3) processed through the CFI facility subject to appropriate authorization.

3.2.6 What is the proposed method of solid waste disposal?

An on site waste segregation system will be used for metals, plastics, refined oils and oily waste. During construction and well recompletion, a standard drill camp will be used. The camps will have a dual-chamber, diesel-fired forced air incinerator. Combustible materials and food wastes will be incinerated onsite on a daily basis. Incinerator ash will be trucked out and disposed of at an appropriate disposal facility. Other industrial and hazardous wastes will be transported south to an approved waste management facilities. Contaminated snow will also be collected and melted and evaporated in a diesel-fired evaporator. Beverage containers will be recycled through local community recycling programs.

3.2.7 List all hazardous materials that will be used during the project as defined under the *Transportation of Dangerous Goods Regulations*.

During operations, limited quantities of oil filters and oily rags required by various service companies will be onsite.

3.2.8 Fuel storage

Requirement	Volume of Diesel Fuel (L)	Storage Location	Containment
Operations	70,000 (15,000 L to 30,000 L Envirotank)	CFI Facility	Secondary containment (built in or bermed)
	70,000	Camp(s)	Secondary containment (built in or bermed)

3.2.9 What is the proposed method of hazardous waste disposal?

Hazardous waste will be transported south to an approved waste management facility.

SECTION 4: DRILLING PROGRAM INFORMATION

4.1 What is the time frame of this project? Will this project be carried out and completed during frozen ground conditions?

Of the activities listed, some or all may be conducted in winter 2008-2011. Key events and approximate time periods for the Project for each year are:

- **Advanced Barge Mobilization** – July to October 15
- **Trucking Mobilization** – mid-November to January, after Inuvik – Tuktoyaktuk Government Road opening
- **Construction of CFI Facility** – late December to February
- **Recompletion** – Two weeks in January
- **Operations** (CFI facility) – February to April
- **Decommissioning** (CFI facility) – April
- **Demobilization** (ice roads) – April
- **Demobilization** (barges) – after spring break-up (June 1 – early July, dependent on barge company)
- **Equipment Staging** – between winter seasons
- **Inspection/Monitoring** – May/June (including final clean-up and reclamation)

4.2 Please describe the methods in which equipment will be brought to the project area and provide a list of heavy equipment that will be transported to the site.

Equipment transport and staging will be integral with MGM's other related activities that have been screened and approved under *West Delta Drilling Completions and Testing Project: 2008-2011*, and *Summer Field Assessment and Advance Barge and Staging Project: 2008-2011*. Four options are being considered for staging and mobilization:

- advance staging of equipment and fuel on barges and freezing in at barge landing sites or staging sites (for details of barge mobilization, see Summer Project PDs)
- barges carrying equipment, materials and fuel will travel to the staging area and offloaded, then return to their place of origin
- mobilization of equipment and fuel by truck to the Project area
- a combination of these options

Equipment Requirements per Cuttings and Fluid Injection related Activity

Construction	Recompletion	CFI Facility Operation
2 Delta 3s	Service or Drilling rig with matting, truck shop and associated equipment	Cuttings/Solids conveyance system (including grinding, injection and support equipment (see Figure 5-3)
Snow making machine(s)	Pressure testing unit	Side-by-side camp buildings suitable for 40 people
10 trucks (e.g., vacuum, water)	Blowout prevention equipment	
Pick-up trucks	Wireline unit and associated equipment	
2 front end loaders with optional attachments	Side-by-side camp buildings suitable for 40 people	
4 plough/auger trucks		
2 graders complete with wing		
1 trackhoe		
1 rubber-tired backhoe		
2 dump trucks		
4 snow cats		
1 Crane		
1 Picker truck		
Trucks/haulers		

4.3 Describe any access routes and their method of construction. How many streams will be crossed? Will any stream crossings greater than 5 m be required?

No distinct access will be constructed for the Project. All access will be constructed as a part of the drilling operations including access to the CFI Facility site.

4.4 Please provide the name, latitude and longitude, and UTM coordinates for all

proposed facility site.

The Project consists of the recompletion and preparation of an existing wellbore for the purposes of cuttings and fluid injection in the outer western Mackenzie Delta.

Project Area	Latitude	Longitude
Ellice Island	69° 2' 02.5" N	135° 41' 48.6" W

See the Figure 4-1 for the existing Aput C-43 well and proposed CFI Facility location

4.5 Indicate the total estimated volume of drilling wastes in cubic metres.

The Project will generate $<1\text{m}^3$ of cement cuttings from well recompletion activity. This material will be treated in the same fashion as the cuttings and fluids from drilling operations (see Section 5.3.4).

As referenced, MGM will conduct batch testing of slurry density and viscosity prior to injection. Samples of water fractions and salinity will be obtained during this testing to compare and contrast with injection zone salinity (i.e., background salinity). The receiving environment of the injection zone is expected to be more saline than the diluted injection slurry. Expected background salinity at Aput has been extrapolated from existing data obtained from similar depth zones in MGM's Atik P-19 well.

4.6 Indicate methods for the disposal of drilling wastes and attach a management plan.

- ☐ Sump
- ☐ Remote Sump
- ☒ Down Hole (liquid or liquid & solids if dedicated injection well)
- ☐ On-site Treatment
- ☐ Off-site
- ☐ Other _____

4.7 What is the capacity in cubic metres of the sump? Attach a drawing to scale of the layout of the proposed sump.

There will be no sump for the Project.

How will the sump berms be protected from erosion?

N/A

Provide information on the soil type, permeability and depth of the active layer at the proposed sump location.

N/A

How will water used for drilling be recycled/reclaimed?

N/A

What measures are contemplated for surface drainage controls?

N/A

What are the planned abandonment procedures for sumps?

N/A

4.8 Mud SystemType(s): Check all that apply:

- ☐ Gelchem
- ☐ Invert
- ☐ KCL
- ☒ Other KCL and water will be used for the well recompletion

Please provide a complete list of all planned drilling mud additives.

N/A

4.9 Indicate any potential for encountering artesian aquifers or lost circulation within the surface hole (to casing depth):

There is NIL potential for encountering artesian aquifers or lost circulation as the existing well bore is cased and cemented.

4.10 Describe the surficial geologic and hydrogeologic conditions in the immediate vicinity of the well site.

The terrain of target area, essentially represented by Ellice and Olivier Islands is low-lying with elevations generally close to sea levels with few areas above 20 m in elevation. The area is generally flat to gently sloping, and is composed primarily of recent river sediments. Some areas of higher ground exist on the southwest corner of Langley Island.

The Project occurs primarily in the outer, active portion of the Mackenzie Delta and overlaps a number of major and minor channels of the Mackenzie River, including Arvoknar and Reindeer Channels. Spring flooding is the most important hydrologic process in the area (Bigras 1990). Peak water levels typically occur from late May to early June and are influenced by ice jams up-river in the main channels of the Delta (Bigras 1990; Marsh et al. 1999). After spring floods, water levels recede over the summer months, with the exception of the occasional rise in water levels because of rainstorms upstream of the Delta (Marsh et al. 1999). River channels are highly turbid during the summer months but become clear with freeze-up.

The hydrology of lakes in the outer Delta is determined primarily by their elevation relative to water levels of the nearby Mackenzie River channels (Marsh et al. 1999). The hydrology of lakes is also influenced by snow melt and surface runoff from the surrounding area. Larger lakes may provide overwintering habitat for fish.

For more detailed description of geologic and hydrogeologic conditions in the vicinity of the well site can be found in Sections 11.3 – *Terrain, Soils and Permafrost* and 11.4 *Hydrology and Water Quality* of the Project Description.

SECTION 5: CONTINGENCY, ABANDONMENT AND RESTORATION PLANNING

5.1 Attach the proposed or existing contingency plan which describes course of action, mitigative measures and equipment available for use in the event of system failures and spills of hazardous materials (in compliance with NWT Water Board Guidelines for Contingency Planning, 1987).

MGM developed an Emergency Response Plan and Spill Contingency Plan (ERP) to be used for winter activities in the Mackenzie Delta region. The ERP covers detailed activities associated with the proposed scope of work. All project staff conducting surveys will be briefed on their responsibilities as outlined in the ERP. Emergency Response drills/exercises are routinely conducted during Project operations to ensure appropriate and timely response to emergency and spill situations.

5.2 Outline the planned abandonment and restoration procedures.

The well will be suspended between operating seasons and ultimately abandoned according to National Energy Board (NEB) requirements.

At the end of each season's injection, the well will be secured in compliance with National Energy Board regulations which may include a steel plug set in the wellhead, wellhead valves shut and chained, and plugs set in the valve openings, providing several levels of wellbore containment.

See section 5.3.5.2 and 5.3.6 of the PD for additional details.

SECTION 6: ENVIRONMENTAL ASSESSMENT AND SCREENING

6.1 Has this project ever undergone an initial environmental assessment, including previous owners? If yes, by whom/when:

The Aput C-43 wellsite was a component of MGM's Ellice, Langley, and Olivier Drilling, Completions and Testing Project which was screened and approved by EISC and CEAA in 2007.

6.2 What baseline data has been collected for the water bodies you intend to cross, do seismic in, or draw water from in the area? Please attach data.

See Section 11. 4 of the Project Description.

6.3 What baseline data has been collected and evaluated with respect to the biophysical components of the environment potentially affected by the project (wildlife, soils, air quality, etc.)? Please attach data.

See Section 11 and Section 12.4 of the Project Description for further details.

**6.4 What community consultation has been done in regards to this project?
Provide details of the program.**

Consultations were conducted from February 12-18, 2008 in Tuktoyaktuk, Inuvik and Aklavik. In addition to these consultations, a further update to MGM operations including the proposed *Cuttings and Fluids Injection Facility* was conducted April 16-30, 2008. The purpose of the consultation meetings and the update meetings was to discuss Project plans, community concerns and proposed mitigations. Communities and local organizations were notified of the proposed Projects, schedules, and the technical details.

Community members and leaders were invited to participate in the evening information sharing and formal presentation session through advertisements posted on community bulletin boards. Emails and facsimiles were also sent to organized groups. The advertising was in place for one week prior to the consultation meetings. In addition, radio ads were transmitted locally prior to the meetings.

Separate meetings were held with the HTC's in each community, and a combined meeting was held in each community with community corporations, elders committees and the general public. Table 10-1 presents the meeting schedule and the number of attendees at each location.

For the meetings conducted in February, four MGM representatives attended the meetings with the HTC's and the community sessions. For the meetings conducted in April, there were two MGM representatives in attendance. The formal presentations consisted of a PowerPoint presentation with specific information on the proposed projects. Paper copies of the presentation were made available. The committees and community members asked questions during and after the presentation. Table 10-2 in Section 10 of the Project Description summarizes the issues raised during the consultations and the corresponding responses and lists sections where these concerns have been addressed in this document. Complete community consultation results can be found in Appendix C of the enclosed Project Description.

Please, refer to the Section 10 – *Community Consultation* of the Project Description for further details.

6.5 Please provide the following information:

- a) description of the environment (including known historic sites, results of any archeological assessments, location of survey monuments, wildlife, waterbodies, etc.)**

See Sections 9 and 11 of the Project Description.

- b) potential environmental impacts (including cumulative and socio-economic effects)**

See Sections 12 and 13 of the Project Description.

- c) proposed mitigation to potential environmental impacts.**

See Sections 12 and 13 of the Project Description.

- d) any follow-up or monitoring programs to be implemented to verify effectiveness of mitigation measures.**

The Project area will be inspected via helicopter during the summer following the completion of each year of the drilling program to ensure all debris has been removed and to assess/identify any residual effects. Activities will be coordinated with all future summer program activities, as discussed in MGM's Summer Field Reconnaissance Project, submitted to the EISC under separate cover. The inspections will take approximately four to six days, and will attempt to target a period of lower sensitivity for migratory birds. Any clean-up work and residual surface disturbance will be addressed as required in consultation with the appropriate regulatory agencies.

See Sections 5.3.5 and 5.3.6 of the Project Description for final decommissioning, cleanup and disposal at the Project site.

SECTION 7: LIST OF ATTACHMENTS

The following references to the listed questions are described in the enclosed MGM Energy Corp. West Delta Drilling, Completion and Testing Project: 2008-2011 Project Description.

Reference to Question #	Title	Page / Section Number
2.1	Project Description	Page 4-2, Figure 4-1
2.1 Table	Project Description	Page 9-1, Table 9-1
3.1.2	Project Description	Page 5-9, Section 5.5
4.2	Project Description	page 5-11, section 5.7;
4.4	Project Description	Page 4-2, Figures 4-1
4.10	Project Description	Page 11-2, Section 11.3 ; Page 11-3, Section 11.4
5.1	Project Description	Page E-1, Appendix E
5.2	Project Description	Page 5-7, Section 5.3.5; page 5-9, section 5.3.6
6.2	Project Description	Page 11-3, Section 11.4
6.3	Project Description	Pages 11-1 to 11-10, Section 11; Pages 12-3 to 12-5, Section 12.4
6.4	Project Description	Page 10-2, Table 10-1; Pages 10-2 to 10-5, Table 10-2; Pages 10-1 to 10-5, Section 10
6.5 a)	Project Description	Pages 9-1 to 9-2, Section 9; Pages 10-1 to 10-5, Section 10
6.5 b) and c)	Project Description	Pages 12-1 to 12-9, Section 12; Pages 13-1 to 13-7, section 13
6.5 d)	Project Description	Pages 5-7 to 5-9; Sections 5.3.5 and 5.3.6