

Liz Castaneda

COPY	
BOARD	3
CHAIR	
E.A.	
W. RES	OK'd
NMDO	1
FILE	1829

From: Information [info@nwtwb.ca]
Sent: Monday, August 04, 2008 9:35 PM
To: castanedal@nwtwb.com
Subject: Fw: MGM Energy Corp. (MAASKANT) Proposed MGM Energy Corp. West Langley Drilling, Completions, Testing and Abandonment Project: 2008-2011
Attachments: ENR Comments - MGM, West Langley.pdf; DFO Comments MGM West Langley Drilling.pdf; Decision Form.pdf; FJMC Comments MGM West Langley.pdf; Tuk Comments.pdf; MGM July 2008 Decision Letter.pdf

-----Original Message-----

From: "EISC"
Sent: 8/1/2008 3:26:12 PM
To: shirley.maaskant@mgmenergy.com
Cc: "EISC" , "Joynt, Amanda A" , "Wall, Erica" , "Bill, Kevin" , "Claire Singer" <Claire_Singer@gov.nt.ca>, "Donald Andre" <Donald_Andre@gov.nt.ca>, "Marsha Branigan" <Marsha_Branigan@gov.nt.ca>, "NWT WB" , mike.fournier@ec.gc.ca, "Myra Robertson" , tumitchiat@northwestel.net, ahtc@airware.ca, "Tuktoyaktuk Hunters & Trappers Committee" , baetz@inac-a-inc.gc.ca, baetz@inac-a-inc.gc.ca, JenkinsRE@inac-a-inc.gc.ca, "Bharat Dixit" , fraser@inac-a-inc.gc.ca
Subject: MGM Energy Corp. (MAASKANT) Proposed MGM Energy Corp. West Langley Drilling, Completions, Testing and Abandonment Project: 2008-2011

Please find the attached Environmental Impact Screening Committee's decision regarding the above noted project description made at their regular meeting held on July 23-25, 2008.

Barb Chalmers

Environmental Assessment Coordinator
 Environmental Impact Screening Committee
 Joint Secretariat-Inuvialuit Renewable Resource Committees
 107 Mackenzie Road, Suite 204, PO Box 2120
 Inuvik, NT X0E 0T0
 TEL 867-777-2828 FAX 867-777-2610
 eisc@jointsec.nt.ca www.jointsecretariat.ca
 COMING SOON - EISC ONLINE REGISTRY SYSTEM and WWW.EISC.CA



8/8/2008



ENVIRONMENTAL IMPACT SCREENING COMMITTEE

Submission Number: [06/08-04]

July 31, 2008

MGM Energy Corp.
Suite 4100
350- 7th Avenue SW
Calgary AB T2P 3N9

ATTENTION: MS. SHIRLEY MAASKANT

Dear Madam:

RE: MGM ENERGY CORP. (MAASKANT) PROPOSED MGM ENERGY CORP. WEST LANGLEY DRILLING, COMPLETIONS, TESTING AND ABANDONMENT PROJECT: 2008-2011

During a meeting held July 23-25, 2008 the Environmental Impact Screening Committee (EISC) screened the above noted project description. Based on the information provided, the EISC concluded that the development will have no such significant negative impact and may proceed without environmental assessment and review under the Inuvialuit Final Agreement. [IFA Section 11.(17)a]. A copy of the decision is attached.

Subject to a final decision by the licensing or permitting authority, the issuance of appropriate permits and approvals may proceed.

The developer has requested a three year approval for the West Langley Drilling Completions, Testing and Abandonment Project (2008-2011). The Committee in considering this request took into account the concerns associated with the staging of fuel in single hulled barges in the Delta. Unless the developer utilizes engineered facilities, existing gravel pads and/or double hulled barges for the staging of fuel, the EISC approval for this development is for one year.

The EISC in providing this approval reminds the developer that any significant change in the project description or a significant incident will require the re-submission of the project to the EISC for environmental screening.

The advice received from Fisheries and Oceans Canada, Fisheries Joint Management Committee, Environment Canada, Environment and Natural Resources (GNWT) and the Tuktoyaktuk Hunters and Trappers Committee is attached for the consideration of the developer and the regulatory authorities.

If there are any questions on the above, please do not hesitate to contact the office.

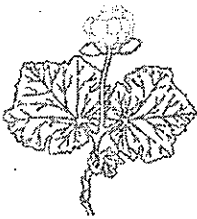
Sincerely,

Barb Chalmers

Barb Chalmers
Environmental Assessment Coordinator

cc. Fisheries and Oceans Canada
Fisheries Joint Management Committee
Environment and Natural Resources (GNWT)
Environment Canada
Indian and Northern Affairs Canada
Department of Transport (GNWT)
National Energy Board
NWT Water Board
Inuvik HTC
Aklavik HTC
Tuktoyaktuk HTC

Attachments: Fisheries and Oceans Canada
Fisheries Joint Management Committee
Environment and Natural Resources (GNWT)
Tuktoyaktuk HTC



ENVIRONMENTAL IMPACT SCREENING COMMITTEE

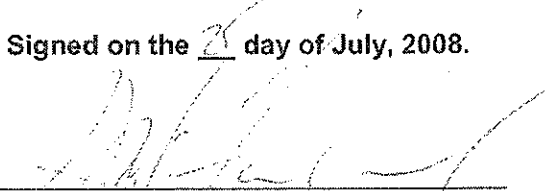
NAME OF PROPONENT: MGM Energy Corp., (MAASKANT)

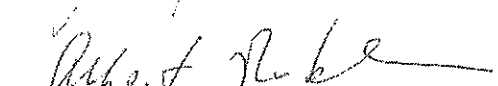
PROJECT DESCRIPTION: Proposed MGM Energy Corp. West Langley Drilling, Completions, Testing and Abandonment Project: 2008-2011, [06/08-04]

DECISION OF THE SCREENING PANEL (circled):


1. The development will have no such significant negative impact and may proceed without environmental impact assessment and review under the Inuvialuit Final Agreement. [IFA s. 11. (17) (a)]
2. The development if authorized subject to environmental terms and conditions recommended by the screening committee, will have no such significant negative impact and may proceed without environmental assessment and review under the Inuvialuit Final Agreement. [IFA s. 11(17)(b)]
3. The development could have significant negative environmental impact and is subject to assessment and review under the Inuvialuit Final Agreement. [IFA s. 11. (17) (c)]
4. The development proposal has deficiencies of a nature that warrant a termination of its consideration and the submission of another project description. [IFA s. 11. (17) (d)]

Signed on the 28 day of July, 2008.

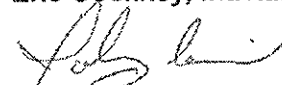

Fred McFarland, Chair


Albert Ruben, GNWT Member


Ron Gruben, Inuvialuit Member


Morris George, YTG Member


Eric Cockney, Inuvialuit Member


Johnny Lennie, Canada Member

From: Claire Singer
To: EISC;
Subject: ENR Comments - MGM, West Langley Project
Date: Friday, July 18, 2008 4:11:59 PM
Attachments: 07-18-2008 ENR Comments - MGM - 06 08-04 - West Langley Project.pdf
07-18-2008 ENR Comments, Att 1 - MGM - 06 08-04 - MGM Delta 6 Projects.pdf
07-18-2008 ENR Comments, Att 2 - MGM - 06 08-04 - Barges Letter.pdf
BEAR RESPONSE GUIDELINES DRWED INUVIK REGION 2007 includ checklist.DOC

Hi Barb,

Please find attached ENR's comments with respect to MGM's West Langley Project. For our records, please respond to this email to indicate your receipt of the attachments. Thanks,

Claire

<<07-18-2008 ENR Comments - MGM - 06 08-04 - West Langley Project.pdf>>
<<07-18-2008 ENR Comments, Att 1 - MGM - 06 08-04 - MGM Delta 6 Projects.pdf>> <<07-18-2008 ENR Comments, Att 2 - MGM - 06 08-04 - Barges Letter.pdf>> <<BEAR RESPONSE GUIDELINES DRWED INUVIK REGION 2007 includ checklist.DOC>>

Claire Singer
Regulatory Assessment Analyst
Environmental Assessment & Monitoring
Dept. of Environment and Natural Resources
Government of the Northwest Territories
Ph: (867) 920-6591
Fx: (867) 873-4021
Email: claire_singer@gov.nt.ca



Northwest
Territories Environment and Natural Resources

July 18, 2008

Barb Chalmers
Environmental Assessment Coordinator
Environmental Impact Screening Committee
The Joint Secretariat – Inuvialuit Renewable Resource Committees
P.O. Box 2120
Inuvik, NT X0E 0T0

Dear Ms. Chalmers:

MGM ENERGY CORP., 06/08-04
West Langley Drilling, Completion, Testing and Abandonment Project,
2008-2011.

The Department of Environment and Natural Resources (ENR) has reviewed the above application based on its mandated responsibilities under the *Wildlife Act*, the *Forest Management Act (FMA)* and the *Environmental Protection Act (EPA)* and provides the following comments for your consideration.

The Proponent's proposed projects in the Inuvialuit Settlement Region have now grown to include 6 projects, with an additional three ongoing (which were previously screened by the EISC) and three foreseeable. These projects and related activities will all occur within a single project area and will utilize common resources. As such, ENR conducted its review in a regional context. This 'regional' review also consists of the following projects:

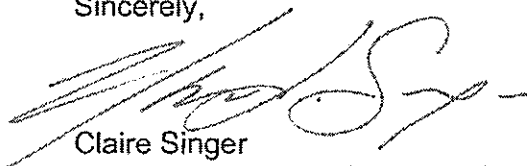
- *MGM Energy Corp., Summer Field Assessment, Advance Barge and Staging Project*
- *MGM Energy Corp., West Delta Drilling, Completion and Testing Project*
- *MGM Energy Corp., Umiak Drilling, Completion and Testing Project*
- *MGM Energy Corp., Umiak Seismic Program*
- *MGM Energy Corp., Cuttings and Fluids Injection Facility at Aput c-43*

All six projects included in ENR's regional review have loose schedules, which makes it difficult to assess spatial and temporal overlap of activities and cumulative effects.

ENR has previously supplied comments and recommendations to the Environmental Impact Screening Committee (EISC), Indian and Northern Affairs Canada (INAC) and the National Energy Board (NEB) with respect to the above noted projects. For consistency and convenience, ENR has updated these documents to include the West Langley Drilling Project (attached)

Should you have any questions regarding the above, please contact Claire Singer, Environmental Regulatory Analyst at 920-6591.

Sincerely,

A handwritten signature in black ink, appearing to read 'Claire Singer', with a horizontal line extending from the end of the signature.

Claire Singer
Environmental Regulatory Analyst
Environmental Assessment and Monitoring
Environment and Natural Resources



Northwest
Territories Environment and Natural Resources

Attachment: MGM Delta 6 Projects, ENR Review, July 16, 2008.

ENR Comments: MGM Energy Corp.

- West Langley Drilling, Completion, Testing and Abandonment Project, 2008 – 2011
- Cuttings and Fluids Injection Facility at Aput C-43, Winter 2008 – 2011
- Summer Field Assessment, Advance Barge and Staging Project: 2008 – 2011
- West Delta Drilling, Completion and Testing Project: 2008-2011
- Umiak Drilling, Completion and Testing Project: 2008-2011
- Umiak Seismic Program: 2008-2011

Table of Contents

1. Environmental Protection.....	2
1.1. Fuel Management.....	2
1.1.1. Fuel Storage in Barges.....	2
1.1.1.1. Summary.....	2
1.1.1.2. Discussion.....	2
1.1.2. Spill Contingency Planning.....	4
1.1.2.1. Discussion.....	4
1.1.3. Recommendations: Fuel Storage and Spill Contingency Planning..	5
1.2. Well Evaluation and Flaring: Air Quality Modelling	6
1.2.1. Discussion.....	6
1.2.2. Recommendations: Air Quality Monitoring	7
1.3. Waste Management	7
1.3.1. Summary.....	7
1.3.2. Discussion.....	8
1.3.2.1. Open Burning	8
1.3.2.2. Incineration of Oily Wastes.....	8
1.3.2.3. Contingency for Wastewater Disposal in Inuvik.....	8
1.3.2.4. Solid Waste Disposal in Inuvik	9
1.3.2.5. Wildlife Attraction to Smelly Wastes	9
1.3.2.6. Recommendations: Waste Management	9
2. Wildlife	11
2.1. Wildlife Disturbance.....	11
2.1.1. Summary.....	11
2.1.2. Discussion.....	12
2.1.3. Recommendations.....	13
2.1.4. General Comments	14

1. Environmental Protection

1.1. Fuel Management

1.1.1. Fuel Storage in Barges

1.1.1.1. Summary

The Proponent has proposed several strategies for supplying and storage of fuel in support of its above reference seismic and drilling projects.

From the information supplied in the Project Descriptions (PDs) for the Proponent's proposed three Drilling Projects, Cuttings and Fluids Injection Facility, plus Seismic Project, ENR is of the understanding that this will require a cumulative total of approximately 10 million litres of fuel per operating season. Additionally MGM has 3 ongoing projects, *Ogruknang 2D Seismic Project, North Ellice and Olivier 3D Seismic Project, and Elice, Langley and Olivier Drilling Testing and Completion Project*. These ongoing projects require a cumulative total of approximately 9 million litres of fuel per operating season. This gives a cumulative fuel requirement of approximately 18 million litres and would potentially result in 24 frozen-in fuel barges per season. This practice does not provide for an acceptable level of environmental protection and could result in significant environmental impacts should a spill take place. There are currently safe alternatives for the storage of these products, including in land-based engineered facilities. These land-based facilities are subject to national and territorial standards designed to ensure human safety, fire prevention and environmental protection measures are implemented and maintained. ENR is not aware of similar standards having been adopted for over-wintering bulk fuel or other dangerous goods in barges in ice. We are also not aware that any barges or other vessels have been specifically designed for this purpose.

1.1.1.2. Discussion

There are several statements made in the Proponent's PDs that present a position in support of the freezing-in of fuel barges for fuel storage. However, the significance of the impacts to the environment if a spill should take place is not adequately considered. For the purpose of example, ENR offers a response to a few examples of oversimplification and inaccurate statements made in the PDs pertaining to the issues surrounding this practice.

The Proponent states that:

"All fuel tanks will have secondary containment, and will accommodate 110 percent of the capacity of the largest tank. All vehicles will have drip pans placed underneath when stationary (Section 5.4.3.3). The likelihood

of any spill exceeding the capacity of the secondary containment structure is unlikely.¹

S 12.7.2,

However, this statement directly contradicts the proposed over-wintering of frozen-in fuel barges in ice for fuel storage. For reasons discussed below, this practice does not accommodate secondary containment or 110 percent capacity of the largest tank.

"Fuel will be brought in and stored in single-hulled barges with fuel in the inner cells only (Table 5-2). The outer fuel cells will be kept empty to provide secondary containment and minimize the risk of leaks to the environment²".

The statement *"The outer fuel cells will be kept empty to provide secondary containment and minimize the risk of leaks to the environment"* is inaccurate. Transport Canada has confirmed that double-hulled vessels are specifically constructed with void compartments on all exterior side and bottom tanks. Even if the wing tanks are empty, single-hull barges do not have void compartments on the bottom. It would be more accurate to state the single-hulled barges, when loaded as described, are "simulating" a double-sided vessel: this is not secondary containment. With respect to using single-hulled barges for the purpose of bulk fuel storage by freezing in ice, Transport Canada has also confirmed that these single-hulled barges have no ice classification (i.e. no additional hull strengthening), which has a bearing on where and when the barge can be moved.

"All applicable regulations relating to barge transportation and staging will be followed, and appropriate regulatory notifications will be made³".

This statement may provide the reader with an unwarranted sense of confidence in the use of barges for fuel storage. Regulations for the prevention of pollution from ships govern the carriage of oil in barges at all times, but do not give explicit direction on the practice of over-wintering frozen-in fuel barges in ice. While the regulations do not explicitly prohibit the practice, the statement may misrepresent the fact that the regulations are silent on the subject. Furthermore, Transport Canada has advised they are unaware of a construction standard for barges for the express purpose of fuel storage.

"Safety precautions will be taken to prevent spillage from the barges during operations in accordance with territorial and federal requirements. The barge contractor will be required to have a valid Shipboard Oil and Pollution Emergency Plan (SOPEP) and will be responsible for initial

¹ Section 5: Development Summary, 12.7.2 Fuel/Fluid Leaks or Spills, page 12-15, *Umiak Drilling, Completion and Testing Project: Winters 2008 – 2011*, Submission to the Inuvialuit Environmental Impact Screening Committee

² Section 5: Development Summary, 5.4.3.2 Fuel Storage and Refuelling, page 5-4, *Umiak Drilling, Completion and Testing Project: Winters 2008 – 2011*, Submission to the Inuvialuit Environmental Impact Screening Committee

³ As above, 12.7.2 Fuel/Fluid Leaks or Spills, page 12-15

containment of hazardous materials in the event of a spill during mobilization⁴”.

As previously stated, this statement may provide the reader with an unwarranted sense of confidence in the use of barges for fuel storage. There are no territorial or federal requirements or Regulations that give explicit direction to precautions on the practice of over-wintering frozen-in fuel barges in ice. Furthermore, ENR understands from its discussion with Transport Canada, that the SOPEP the Proponent has described is primarily for the purpose of providing a call-out number list and basic instructions to the master in the case of emergency while the vessel is operational, and in consideration of an operational fuel oil spill. This plan is not intended for lay-up/storage procedures, is not for response, and does not does address the over-wintering of a frozen-in fuel barge in ice.

“The risk of fuel spills during transport by barge is considered lower than risks associated with ice road transport⁵”.

It is not accurate to compare the construction of barges with tanker trucks. Vehicles for fuel transport are constructed to standards that are specific to their mode of transport. It is the safeguards with respect to freezing in barges for storage that is in question, not transportation.

1.1.2. Spill Contingency Planning

1.1.2.1. Discussion

The Proponent has supplied a detailed MACKENZIE DELTA EMERGENCY RESPONSE PLAN. However, there no evidence that site-specific Spill Contingency Plans have been or will be developed for land-based fuel storage areas/facilities.

There are contradictory statements with respect to fuel storage on ice. For example, it is stated:

During the seismic operations, mobile fuel sloops will be required for storing and dispensing diesel fuel. These sloops will have 110% secondary containment capacity and will have a combined capacity of 79,000 litres. The sloops will be stationed on ice pads at least 100 m from any waterbody, and surrounded with a snow/ice berm when they are stationary for at least 48 hrs. MGM is not planning to store fuel on frozen waterbodies. Fuel sloops that are temporarily located on bottom-fast ice or on sandbars will be subject to the same mitigation measures.⁶”

⁴ Section 5: Development Summary, Section 5.2.5.4 Fuel Staging, page 5-11, *Summer Field Assessment, Advance Barge and Staging Project: 2008 – 2011*, Submission to the Inuvialuit Environmental Impact Screening Committee

⁵ Section 5: Development Summary, 12.7.2 Fuel/Fluid Leaks or Spills, page 12-15, *Umiak Drilling, Completion and Testing Project: Winters 2008 – 2011*, Submission to the Inuvialuit Environmental Impact Screening Committee,

⁶ Section 5. Project Summary, 5.9 Fuel and Fuel Storage, page 17, *Project Description for the Proposed MGM Energy Corp. Umiak Seismic Program: 2008-2011*

It is unclear to ENR why *"Fuel sloops that are temporarily located on bottom-fast ice or on sandbars will be subject to the same mitigation measures"* if *"MGM is not planning to store fuel on frozen waterbodies"*. In other words, why is it implied that fuel sloops may be temporarily stored on bottom-fast ice or sandbars, which are within 100 metres of waterbodies.

1.1.3. Recommendations: Fuel Storage and Spill Contingency Planning

Significant quantities of refined petroleum products and other dangerous and hazardous goods will be transported, stored and utilized during the proposed various oil and gas related activities over three working seasons. ENR is concerned that there is significant potential for spills that would result in negative environmental impacts.

In the supplied Project Descriptions, the Proponent has proposed several potential alternate strategies for storage of fuel in support of these projects, including the use of land based storage tanks and/or facilities. ENR recommends that all fuel storage in support of all MGM projects be done in land-based facilities. In addition, where practical and feasible, refueling and fuel storage be restricted to designated bermed areas that are also:

- At a distance greater than 100m from any local high water mark,
- Not located in a drainage channel; and
- At a location that avoids steep grades to waterbodies.

In the case that MGM Energy Corp. continues to pursue the freezing-in of fuel barges as a bulk fuel storage option for the projects in question, ENR will expect that a more thorough and detailed review and assessment of the potential impacts of this method of storage is conducted, prior to the commencement of the projects' licencing/permitting.

ENR recommends that the Proponent update the provided MACKENZIE DELTA EMERGENCY RESPONSE PLAN to include:

- Correct listings in the Regulatory Agencies section, *Regulatory Agency Emergency Contact List*. An incorrect Agency and Person name Phone Number is listed for GNWT. The NWT 24-Hour Spill Report Line is 867-920-8130. The Department is Environment and Natural Resources.
- Develop Site-specific Spill Contingency Plans for all locations where refined petroleum products will be stored, and that copies of the plans are distributed to environmental monitors, operators and contractors in the Field. The site-specific Spill Contingency Plans should include, but not be limited to:
 - An inventory of response and clean-up equipment;
 - A site map with location of storage facilities, and the location of emergency equipment and spill response and clean-up equipment; and

- o A cover page that clearly identifies: The NWT 24-Hour Spill Report Line; the name, job title and 24-hour telephone number for the person(s) responsible for activating the Spill Contingency Plan.

With respect to the design of fuel storage facilities, ENR recommends that the Proponent ensure that the most recent version of the National Fire Code of Canada is referenced (2005). ENR further recommends that the Proponent consult the *Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products* (CCME 2003, including, but not limited to Sections 3, 4, 8 and 9).

ENR recommends that the proponent establish designated fuel storage and refueling areas that are:

- o at a distance greater than 100 meters from any local high water mark, unless otherwise authorized by an inspector upon review of the specific location and conditions of concern;
- o not located in a drainage channel; and
- o at a location that avoids steep grades from waterbodies.

In the case that fuel is transferred via barges or other seagoing vessels, ENR recommends that the *Arctic Waters Oil Transfer Guidelines* (Transport Canada, April 1997) be adhered to during loading and offloading.

1.2. Well Evaluation and Flaring: Air Quality Modelling

1.2.1. Discussion

MGM has submitted surrogate air quality modelling assessments for both proposed drilling projects. The surrogates are in the form of previous flare dispersion assessments that were conducted for past well evaluation projects, Ellice and Langley, drilled recently in the same operational area. Environment Canada and the Government of the Northwest Territories have previously reviewed these previous assessments and found them acceptable.

Submitting surrogate air quality modelling assessments is an acceptable approach provided the proponent demonstrates that the projects are indeed similar. However, the previous drilling projects did not result in gas discoveries and therefore no well evaluations or flaring were actually conducted that allowed verification of the modelling. And, the Proponent has not provided a project-to-project comparison of flaring scenarios (e.g. the likely gas chemistry, volumes flared, physical stack parameters etc - in tabular form). The absence of confirmatory evidence of previous modelling assessments makes comparison for the current projects difficult. Verification will be required if the proposed projects result in flaring.

MGM also indicates that it will "...adhere to National Energy Board Flaring Guidelines...". However, ENR is unaware of the NEB 'guidelines' that MGM is referring - the document does not appear in the References, and discussion with NEB indicates that they have no such 'guidelines'.

1.2.2. Recommendations: Air Quality Monitoring

ENR recommends that in the case well evaluations or flaring are conducting within the proposed activities, that the Proponent provide post-flaring reports for each of the well evaluations, which includes a comparison to the modelling assessments submitted.

ENR recommends that the Proponent provide clarification and appropriate reference to the "*National Energy Board Flaring Guidelines*" it references with respect to its planned flaring.

1.3. Waste Management

1.3.1. Summary

MGM is proposing three Drilling Projects, a Cuttings and Fluids Injection Project, a Seismic Program, and a Field Assessment Project. The Proponent has stated in the Project Descriptions (PDs) that it is committed to supplying a project specific Waste Management Plan for each project:

"A Waste Management Plan will be tailored for the Project to identify wastes, handling and storage practices, preferred management and disposal options as well as approved disposal facility contact information.⁷"

"The incinerator waste management details will be incorporated into the Project Waste Management Plan, which is being developed.⁸"

However, the project-specific Waste Management Plans and related details have not been provided. However, various commitments have been made, including:

- "MGM has determined that there are no acceptable landfills in the Northwest Territories capable of handling the majority of wastes produced from its activities. Therefore, MGM will be shipping the wastes produced from its construction, seismic and drilling activities to approved disposal facilities and recyclers in British Columbia and Alberta⁹."
- "The incinerator will be a dual chambered, diesel fired forced air incinerator with a minimum capacity of 1.4 m³, 90 kg per hour, The

⁷West Langley Drilling, Umiak Drilling, and West Delta Drilling Project Descriptions (PDs) state in Appendix G,I and H, respectively, section 18

⁸ Seismic Program PD, Section 5.8.1

⁹ Glen Miller, gmliller@mgmenergy.com , 4/8/008, MGM Energy Corp. Waste Management Plan, Revised 11/2/2007, p 2.

contractor, once selected, will provide details of proper training of the incinerator operator.¹⁰

- "To meet Canada wide requirements, combustibles and food wastes will be incinerated (approx one cubic metre / day) on-site on a daily basis in a dual chamber diesel fired forced incinerator, with the residue trucked out and disposed of at an approved landfill." (Reference as above)

1.3.2. Discussion

Upon review of the PDs and the Proponents Waste Management Plan, ENR has the following outstanding concerns related to solid waste management, incineration and wastewater treatment planning.

1.3.2.1. Open Burning

Statements in both the PDs and supplied generic Waste Management Plan imply that the Proponent is considering open burning of materials¹¹. Open burning of waste material represents an inefficient disposal method. The low temperature, smouldering nature of open burning tends to result in poor combustion of material, enhancing the emissions and production of toxic substances.

1.3.2.2. Incineration of Oily Wastes

Statements in the PDs imply that wastes to be incinerated include refined oils and oily wastes¹². In regard to the incineration of oily wastes, due to the increased potential for generation of toxic emissions, ENR does not endorse the incineration of Industrial Hazardous or Dangerous Wastes that results from operations or the clean up of spills of refined petroleum products and/or dangerous and hazardous goods and waste (unless authorized in the case of an emergency). The only exception is if the incineration device is designed for the incineration of hazardous wastes and is capable of meeting specific emission limits, as determined on a case-by-case basis, including those established under the CWS for Dioxins and Furans and the CWS for Mercury Emissions.

In some circumstances, used oil (although potentially classified as an *Industrial Hazardous Waste*) can have a secondary value as a resource if it is burned as a fuel (e.g. for space heating). However, used oil can contain metals and other contaminants, and improper burning can lead to the otherwise preventable formation and spread of contaminants in the workplace and in the greater environment.

1.3.2.3. Contingency for Wastewater Disposal in Inuvik

The PDs states that the contingency for wastewater treatment and disposal is transport to Inuvik¹³. The Proponents contingency plan to transport blackwater waster to Inuvik for disposal is not reasonable or appropriate given the potential

¹⁰ Umiak Seismic Program PD, Section 5.8.1

¹¹ MGM Energy Corp. Waste Management Plan, Revised: 11/7/2007, Section 5.5 Open Burning, p 7

¹² Umiak and West Delta PD, section 5.4.4.9

¹³ Umiak and West Delta Drilling PDs, Section 5.4.4.8

large volumes of sewage waste involved in its operations. The described Drilling Projects and the Seismic Program, under optimum conditions, would result in a total of 778 personnel per season. ENR estimates that disposal of this wastewater could result in a 20% increase, by volume, of wastewater to the Inuvik Lagoon. This may result in negative impacts and unwanted liabilities to the community for obvious reasons.

1.3.2.4. Solid Waste Disposal in Inuvik

The Summer Field Assessment and Barge Staging PD states that Garbage will be removed from sites and transported to Inuvik for disposal¹⁴, and that Tugboats and the bathymetry vessel will store and dispose of waste on board at an appropriate waste disposal facility. The Proponent has proposed that waste be disposed of in the Town of Inuvik without providing evidence of prior approval from the community. This may result in negative impacts and unwanted liabilities to the community.

1.3.2.5. Wildlife Attraction to Smelly Wastes

The Proponent has not supplied measures that minimize the attraction of wildlife to smelly waste. Wildlife attraction can lead to unwanted wildlife-human contact, and/or habituation of wildlife, both of which may lead to an increase in mortality of 'nuisance wildlife', due to kills by camp or regulatory personnel for safety reasons.

1.3.2.6. Recommendations: Waste Management

The Proponent should prepare and submit a stand-alone **Waste Management Plan** for each referenced project to demonstrate that proper waste management planning is in place prior to the commencement of operations. The Plan should also demonstrate that authorization has been obtained for the use of off-site waste disposal facilities. The Plan should then be approved by the regulatory authority and be incorporated as a condition of the project licence, permit, or other regulatory authorization. The Waste Management Plan should include adherence to all the proponent's relevant waste management commitments, and also include/address, but not be limited to:

- The identification of waste storage and transport mitigative measures to prevent wildlife attraction. Whether garbage is stored for the purpose of on-site or off-site disposal (i.e. road or air transport), it must be stored in an airtight sealed container to prevent wildlife from being attracted to odors;
- The open burning of non-segregated municipal solid wastes (MSW) - 'camp waste' - is an unacceptable waste management option. The only wastes that are suitable for open burning are paper products, paperboard packaging and untreated wood wastes. Please consult the document titled *Municipal Solid Wastes Suitable for Open Burning* available at <http://www.enr.gov.nt.ca/eps/envIRON.htm>.

¹⁴ Summer Field Assessment, Advance Barge and Staging Project: 2008 – 2011, Section 5.3.4.

- With respect to the incineration of waste oil, it may contain metals and other contaminants. If waste oil is incinerated it should:
 - a) Be burned in an approved waste oil burner and the waste oil should be tested for contaminants as required in the NWT under the *Used Oil and Waste Fuel Management Regulations*; or
 - b) If it cannot be demonstrated that the waste oil meets the Used Oil and Waste Fuel Management Regulations previously referenced, it must be burned in an incineration device that is capable of meeting the emission limits established by the Canadian Council of Ministers of the Environment (CCME) under the Canada-wide Standards (CWS) for Dioxins and Furans and the CWS for Mercury Emissions; or
 - c) If the standards included in part a) and b) cannot be met, the waste should be safely stored and transported in sealed containers (odour free to prevent animal attraction) and safely transported to a facility that is a registered recycling or disposal facility for these wastes.
- A detailed description of wastewater treatment and disposal strategies that does not include the use of NWT based disposal facilities. This should include additional redundancy within its onsite/regional treatment and disposal plans that ensures adequate contingency for camp waste treatment and disposal. The proposed contingency to use the Inuvik Lagoon is not reasonable given the potential high volumes of waste to be produced.
- With respect to the use of NWT based community waste management infrastructure, the Plan should demonstrate:
 - a) Written consent is received from the community that states it has been consulted on the types and quantities of waste proposed for disposal, and that the community is allowing the use of its waste management infrastructure,
 - b) The community and/or facility has Land Use Permit and/or Water License authorizations that allow the disposal of waste sourced from outside industrial operations and camps, and
 - c) Reference the community bylaws that facilitate the use of its waste management infrastructure sourced from outside industrial operations and camps.
- Detailed incineration Management Strategies.
 The **Waste Management Plan** should include detailed *Incineration Management Strategies* that demonstrate that the device and procedures selected are suitable to the waste stream types intended for treatment. Otherwise, significant environmental impacts, including the production of toxic compounds, will likely result. Incineration strategies should meet the emissions limits established under the Canada-wide Standards (CWS) for Dioxins and Furans (CCME 2001)¹⁵ and the CWS for Mercury Emissions (CCME 2000)¹⁶. These *Incineration Management Strategies* should also include:
 - o A description of waste streams intended for incineration;

¹⁵ http://www.ccme.ca/assets/pdf/d_and_f_standard_e.pdf

¹⁶ http://www.ccme.ca/assets/pdf/mercury_emis_std_e1.pdf

- o Selected incineration technology and rationale for selection (the minimum requirement to accommodate complex waste streams should be a dual-chamber, controlled-air incinerator);
- o A description of recycling and waste segregation plans that control waste entering the incinerator;
- o Operator training and qualifications, and the use of trained and designated operators;
- o Procedures for operation and maintenance, including record-keeping (i.e. completion of burn cycle and maintenance logs, and recording of the weight of each waste load charged to the incinerator);
- o A reporting requirement to summarize the tracking and record-keeping component;
- o Weigh scales to record the weight of each load charged to the incinerator;
- o Incineration residual disposal procedures (If incinerator bottom and/or fly ash are targeted for disposal in the NWT, it must be tested prior to disposal to ensure that it meets the criteria specified in the NWT Environmental Guideline for Industrial Waste Discharges¹⁷. Incineration ash can be contaminated with toxic compounds and by-products such as dioxins and furans and should therefore be tested to ensure that it is disposed of in an appropriate and approved manner).

2. Wildlife

2.1. Wildlife Disturbance

2.1.1. Summary

From the MGM West Langley submission, it appears the proponent is unsure of the timetable and is trying to leave the schedule completely open. Based on the information provided the work should take a maximum of 2 years to complete yet the PD has a 4 year span. This is also true for the other project description submitted. It is difficult to assess spatial and temporal overlap of activities and cumulative effects with such undefined schedules.

In the West Langley submission, the proponent mentions "liaising" with ENR and "determining with consultation" with ENR yet **ENR Inuvik region has not been contacted about this project**. Prior discussions may have cleared up some of the misunderstandings mentioned later in our comments. Historically ENR has worked with proponents to conduct fall denning surveys to identify active grizzly bear dens at the proponent's expense. To date ENR does not have a methodology in place to identify polar bear denning in the area. ENR could assist the proponent to identify potential denning habitat within the project area

¹⁷ <http://www.enr.gov.nt.ca/library/pdf/eps/industrialwastedischarges.pdf>

and ENR is working with CWS to produce maps of potential habitat but these are not complete. Again, discussions with the proponent prior to project submissions would have been beneficial.

The proponent has committed to the following mitigation measures related to wildlife:

- Utilize wildlife monitors to monitor bear activity, and to manage bear encounters;
- Follow *ENR's Bear Encounter Response Guidelines* (attached);
- Avoid all sighted bears and allow them to leave the area and suspend activities or relocate as necessary; Polar and grizzly bears will not be harassed;
- Report any defense of life and property bear kills to the Department of Environment and Natural Resources ASAP;
- Adhere to the Recommended Environmentally Acceptable Minimum Flight Altitudes provided by the Inuvialuit Game Council;

2.1.2. Discussion

ENR acknowledges the mitigation measures set out by the Proponent to minimize impacts to wildlife and wildlife habitat. However, we have outstanding concerns with respect to some of the Proponent's proposed mitigative measures.

For example:

- The proponent states in the Executive Summary, Disturbance of foraging bears "Bear overflight guidelines will be determined through consultation with ENR". ENR recommends the proponent adhere to the recommended environmentally acceptable minimum flight altitudes provided by the Inuvialuit Game Council;
- The proponent states in the Executive Summary, Disturbance of denning Polar Bears and foraging bears, the proponent indicates "sensory disturbance during construction and operations of drilling operations and winter roads" and "sensory disturbance from reconnaissance flights". Furthermore, section 5.3.3.6 Air Support, the proponent states "air support will be required to mobilize the camp start-up and construction crew to the site and to provide emergency evacuation and crew changes". Aircraft over-flights can disturb wildlife increasing stress and potentially effect overall health and condition of local wildlife.
- Section 5.3.4.1 Access, the proponent commits to "Before beginning, Project maps of the known and potential Project sites and access routes will be provided to the Department of Environment and Natural Resources (ENR), Government of the Northwest Territories (GNWT) to allow for locations of bear dens to be identified. Where necessary, road alignments may be modified to avoid important sites". The proponent has not discussed these proposed mitigation measures with ENR.

The following SARA-listed species have the potential to occur in the project area:

- Peregrine Falcon (Special Concern)
- Short-eared owl (Special Concern)

The *Species at Risk Act (SARA)* states that adverse effects on listed species must be identified and assessed, and regardless of significance, mitigated and monitored (Section 79). It is ENR's view that the treatment of those species listed under the Act be consistent with the treatment of species assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

The following COSEWIC listed species have the potential to occur in the project area:

- Polar bear (Special Concern);
- Grizzly Bear (Special Concern);
- Wolverine (Special Concern);

2.1.3. Recommendations

To minimize the disturbance to wildlife and wildlife habitat and increase the protection of wildlife and field personnel ENR recommends the following additional mitigation measures be implemented.

The Proponent shall adhere to the following:

- Combine aircraft flights with concurrent MGM projects to reduce the number of flights in the project area;
- Conduct Fall grizzly bear denning surveys in collaboration with ENR
- If caribou approach or are encountered within 500m of project activities, the Proponent should cease operations until caribou are no longer with the range;
- Instruct Pilots to avoid all wildlife when accessing and/or transporting crews to selected field operation sites;
- Do not feed or harass wildlife;
- Maintain a minimum distance of 1.5 km between any project activities and observed/known peregrine falcon nesting sites from April 15th to September 15th;
- Avoid any species-at-risk that are encountered during the course of this land use operation and the Proponent will minimize all activity so as to not disturb these animals; and,
- Have, and keep up to date, a record of wildlife sightings that is submitted to the nearest Renewable Resource Officer upon completion of the field season.

2.1.4. General Comments

Provide all field personnel with bear-safety training prior to field operations. This is both a wildlife and a safety issue. If all field personnel receive this training and learn how to react to bears, the number of nuisance bears killed should decrease.

July 15, 2008

Barb Chalmers
Environmental Assessment Coordinator
Environmental Impact Screening Committee
The Joint Secretariat – Inuvialuit Renewable Resource Committees
P.O. Box 2120
Inuvik, NT X0E 0T0

Dear Ms. Chalmers:

Re: MGM Energy Corp. Fuel Storage in Barges

- **06/08-04: West Langley Drilling, Completion, Testing and Abandonment Project, 2008 –2011**
- **05/08-03 Cuttings and Fluids Injection Facility at Aput C-43, Winter 2008 – 2011**
- **03/08-04: Summer Field Assessment, Advance Barge and Staging Project: 2008 – 2011**
- **03/08-03: Umiak Seismic Program: 2008-2011**
- **03/08-02: West Delta Drilling, Completion and Testing Project: 2008-2011**
- **03/08-01: Umiak Drilling, Completion and Testing Project: 2008-2011**

This letter is addressed to the Environmental Impact Screening Committee (EISC) with the intent that it be considered in all existing or pending screenings and reviews of the above referenced Projects' plans and all potential related authorizations.

MGM Energy Corp. has submitted the above referenced Project Descriptions (PDs) for its seismic, drilling projects, and related projects proposed to operate from 2008 through 2011 in the Mackenzie Delta Region. The Department of Environment and Natural Resources (ENR) is presently reviewing these PDs through the screening process facilitated by the Environmental Impact Screening Committee. These multiple projects and related activities will occur within a single project area and will utilize common resources. As such, ENR's review of the PDs is done in a regional context.



MGM has stated in its PDs for these projects that it plans as a primary storage method the over-wintering of large quantities of fuel in "frozen-in" single hulled fuel barges, with each containing up to 750,000 L of diesel fuel¹. ENR has calculated from the information supplied in the PDs for the proposed Drilling Projects plus Seismic Project, a cumulative total requirement of approximately 10 million litres of fuel per operating season, or more. This could potentially result in over 13 frozen-in fuel barges per season, and cumulatively, over 39 frozen-in fuel barges over the three season operation period. A more detailed review of this issue is included in ENR's comment letter that has been submitted directly to the EISC for the projects referenced here.

ENR, has on numerous previous occasions communicated that except in the case of an emergency where there is no reasonable alternative exists, it does not support the over-wintering of bulk fuel or other dangerous goods in barges or other vessels in ice. This practice does not provide for an acceptable level of environmental protection and could result in significant environmental impacts should a spill take place. There are currently safe alternatives for the storage of these products, including in land-based engineered facilities. These land-based facilities are subject to national and territorial standards designed to ensure human safety, fire prevention and environmental protection measures are implemented and maintained. ENR is not aware of similar standards having been adopted for over-wintering bulk fuel or other dangerous goods in barges in ice. We are also not aware that any barges or other vessels operating in the NWT have been specifically designed for this purpose.

In the supplied PDs, the Proponent has proposed several potential alternate strategies for storage of fuel in support of these projects, including the use of land based storage tanks and/or facilities. ENR recommends that all fuel storage in support of the referenced projects be done in land-based facilities.

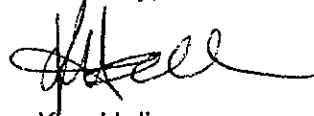
In order to adequately review and assess the safety of over-wintering fuel in barges it would be necessary to conduct an assessment of the potential immediate and incremental risks and impacts of this method of storage, and compare these risks and impacts with other reasonable alternatives. ENR would welcome the opportunity to review such an analysis and to subject it to review by independent experts.

In the event that MGM Energy Corp. continues to pursue the freezing-in of single hulled fuel barges as a bulk fuel storage option for the projects in

¹ Section 5: Development Summary, Section 5.2.5.4 Fuel Staging, page 5-11. *Summer Field Assessment, Advance Barge and Staging Project: 2008 – 2011*, Submission to the Inuvialuit Environmental Impact Screening Committee

question, ENR will expect that a more thorough and detailed review and assessment of the potential impacts of this method of storage is conducted, prior to the commencement of the projects' licencing/permitting.

Sincerely,

A handwritten signature in black ink, appearing to read 'Ken Hall', with a stylized flourish extending to the right.

Ken Hall
A/Director



Bear Encounter Response Guidelines

I. PRINCIPLES:

1. Protection of Life and Property
2. Conservation

II. OPERATIONAL GUIDELINES:

- A. Deterrence
- B. Re-locate, if feasible
- C. Destroy

III. OPERATIONAL PROCEDURES:

Contacts:

Initial contact: Ian Ellsworth, Senior Compliance Officer

Tel: (867)-777-7230 (w)
(867) 777-1185 (cell)
(867) 777-7236 (fax)

Response Personnel:

The following personnel can be available for responding to problem bear situations:

Owen Allen	Inuvik	777-7201	
Kevin Allen	Inuvik	777-7308	678-5314 (cell)
Paul Voudrach	Inuvik	777-7289	
Ian McLeod	Aklavik	978-2248	

Initial Contact:

1. The complainant should complete the attached checklist prior to calling DENR. It is critical that as much information as possible be provided at this point in order to determine the appropriate response.

IV. RESPONSE

Wildlife Monitors will be the initial responders to problem bears. It is imperative that they have a sufficient supply of approved deterrents at their disposal. All bear sightings and encounters shall be reported to the ENR office closest to the area of operation.

The potential responses will be considered in the following order:

a) Camps

1. Wildlife Monitors will employ conventional means of deterring problem bears which threaten public safety or property. This may involve chasing a bear out of the camp with a vehicle or snowmobile, or using noise makers and rubber bullets. If these methods prove ineffective, and where a helicopter is available or can be obtained in the area, the bear may be chased from camp. Pilots must be careful not to over stress the bear during this flight and must back off when the bear is a sufficient distance from the camp and keeps running in the desired location. If circumstances allow, a Renewable Resource Officer (RRO) should be contacted prior to using aircraft to deter bears. Undue harassment is illegal and must be avoided. **All incidents involving any means of deterrence should be reported to a Renewable Resource Officer as soon as possible.**
2. Should for some reason, the Wildlife Monitor be unable to deter a bear, and where the bear does not pose an immediate threat to public safety or property, the Department of Environment and Natural Resources (DENR) may send a deterrent or capture team to the site.

b) Denning bears

If a bear is located in, at or near a den site, work in the area must halt. All employees should safely retreat from the area and report the occurrence to the Site Supervisor, Wildlife Monitor, and the Renewable Resource Officer in your area as soon as possible. Staff from DENR will be required to assess the site and may implement measures to ensure bears are not unduly disturbed. This may include the establishment of an exclusion zone of 300 meters around the den in which no work will be permitted. Work inside the exclusion zone will remain stalled until after den emergence.

c) Free ranging bears

Prior to active deterrence of free ranging bears, and where public safety or property is not in immediate danger, the Wildlife monitor will assess the situation. The monitor should determine if the bear has been disturbed from a den or if it is denning in close proximity. Bears in the vicinity of a den should not be deterred and work should cease until DENR has assessed the site. If the Wildlife Monitor has determined that the bear is in fact free ranging, and not lingering around a den site, then active deterrence may commence.

d) Destruction of the bear

Instructions to destroy the bear will be given when deterrent actions have failed, when additional deterrent actions are not possible, and when it is determined that capture and relocation cannot be conducted or is unlikely to be successful.

The bear can be destroyed if human life or property is in immanent danger.

If a bear is killed, you will be required to:

- 1) Report the kill to DENR, as soon as possible.
- 2) Skin the bear, leaving the claws and penis (if applicable) attached, and preserve the hide by freezing or salting it and storing it in a cool place. Be generous with the salt.
- 3) Turn in the hide, the skull, and any other biological samples requested to a DENR Renewable Resource Officer.

As per the NWT Wildlife Act, no person may retain any part of a bear killed in defence of life or property.

V. FOLLOW-UP

After response measures are completed, the situation will be reviewed with the camp operator and corrective actions identified. These may include a wide array of actions aimed at avoiding future bear problems and ensuring that the operator is made aware of legal obligations. The need for conservation and the vulnerability of bear populations to over harvest is to be stressed.



Department of Environment and Natural Resources
Bag Service #1 Inuvik, NT X0E 0T0
FAX (867) 777-7236

Bear Complaint Checklist

1. Complainant Details:

Date/Time of Report: _____
Complainants Name: _____
Affiliation/Location of Complainant: _____
Contact Number for Complainant: _____
Other on Site Contacts: _____
Wildlife Monitors Name: _____

2. Camp Details:

Location of Complaint: _____
Latitude/Longitude: _____
Type of Camp- Permanent/ Mobile: _____
Number of People in Camp: _____
How Long has Camp Been Here (if Mobile): _____
Are there any Aircraft on site? If yes, Type: _____

3. History of the Problem:

Date/Time Bear First Sighted: _____
Type of Bear: Grizzly _____ Polar _____ Black _____
Sex of Bear: Male _____ Female _____ Unknown _____
Age of Bear: Cub _____ Juvenile _____ Adult _____
Has Bear Been Observed Before: _____
Den site found (description)? _____
What was the Bear Attracted To: _____
Did the Bear Obtain Food: _____
Behaviour of Bear: Fearful _____ Not Fearful _____ Aggressive _____
Damage By Bear: _____

4. Deterrent Action:

Was the Bear Deterred? Yes _____ No _____
If Yes, Type of Deterrent Used: _____
Present Status of Bear: _____

5. Other Information:

Reporters Name/Title: _____
Weather on Site at Time of Report: _____
Checklist Forwarded to: _____



Bear Encounter Response Guidelines

I. PRINCIPLES:

1. Protection of Life and Property
2. Conservation

II. OPERATIONAL GUIDELINES:

- A. Deterrence
- B. Re-locate, if feasible
- C. Destroy

III. OPERATIONAL PROCEDURES:

Contacts:

Initial contact: Ian Ellsworth, Senior Compliance Officer

Tel: (867)-777-7230 (w)
(867) 777-1185 (cell)
(867) 777-7236 (fax)

Response Personnel:

The following personnel can be available for responding to problem bear situations:

Owen Allen	Inuvik	777-7201	
Kevin Allen	Inuvik	777-7308	678-5314 (cell)
Paul Voudrach	Inuvik	777-7289	
Ian McLeod	Aklavik	978-2248	

Initial Contact:

1. The complainant should complete the attached checklist prior to calling DENR. It is critical that as much information as possible be provided at this point in order to determine the appropriate response.

IV. RESPONSE

Wildlife Monitors will be the initial responders to problem bears. It is imperative that they have a sufficient supply of approved deterrents at their disposal. All bear sightings and encounters shall be reported to the ENR office closest to the area of operation.

The potential responses will be considered in the following order:

a) Camps

1. Wildlife Monitors will employ conventional means of deterring problem bears which threaten public safety or property. This may involve chasing a bear out of the camp with a vehicle or snowmobile, or using noise makers and rubber bullets. If these methods prove ineffective, and where a helicopter is available or can be obtained in the area, the bear may be chased from camp. Pilots must be careful not to over stress the bear during this flight and must back off when the bear is a sufficient distance from the camp and keeps running in the desired location. If circumstances allow, a Renewable Resource Officer (RRO) should be contacted prior to using aircraft to deter bears. Undue harassment is illegal and must be avoided. **All incidents involving any means of deterrence should be reported to a Renewable Resource Officer as soon as possible.**
2. Should for some reason, the Wildlife Monitor be unable to deter a bear, and where the bear does not pose an immediate threat to public safety or property, the Department of Environment and Natural Resources (DENR) may send a deterrent or capture team to the site.

b) Denning bears

If a bear is located in, at or near a den site, work in the area must halt. All employees should safely retreat from the area and report the occurrence to the Site Supervisor, Wildlife Monitor, and the Renewable Resource Officer in your area as soon as possible. Staff from DENR will be required to assess the site and may implement measures to ensure bears are not unduly disturbed. This may include the establishment of an exclusion zone of 300 meters around the den in which no work will be permitted. Work inside the exclusion zone will remain stalled until after den emergence.

c) Free ranging bears

Prior to active deterrence of free ranging bears, and where public safety or property is not in immediate danger, the Wildlife monitor will assess the situation. The monitor should determine if the bear has been disturbed from a den or if it is denning in close proximity. Bears in the vicinity of a den should not be deterred and work should cease until DENR has assessed the site. If the Wildlife Monitor has determined that the bear is in fact free ranging, and not lingering around a den site, then active deterrence may commence.

d) Destruction of the bear

Instructions to destroy the bear will be given when deterrent actions have failed, when additional deterrent actions are not possible, and when it is determined that capture and relocation cannot be conducted or is unlikely to be successful.

The bear can be destroyed if human life or property is in immanent danger.

If a bear is killed, you will be required to:

- 1) Report the kill to DENR, as soon as possible.
- 2) Skin the bear, leaving the claws and penis (if applicable) attached, and preserve the hide by freezing or salting it and storing it in a cool place. Be generous with the salt.
- 3) Turn in the hide, the skull, and any other biological samples requested to a DENR Renewable Resource Officer.

As per the NWT Wildlife Act, no person may retain any part of a bear killed in defence of life or property.

V. FOLLOW-UP

After response measures are completed, the situation will be reviewed with the camp operator and corrective actions identified. These may include a wide array of actions aimed at avoiding future bear problems and ensuring that the operator is made aware of legal obligations. The need for conservation and the vulnerability of bear populations to over harvest is to be stressed.



Department of Environment and Natural Resources

Bag Service #1 Inuvik, NT X0E 0T0

FAX (867) 777-7236

Bear Complaint Checklist

1. Complainant Details:

Date/Time of Report: _____

Complainants Name: _____

Affiliation/Location of Complainant: _____

Contact Number for Complainant: _____

Other on Site Contacts: _____

Wildlife Monitors Name: _____

2. Camp Details:

Location of Complaint: _____

Latitude/Longitude: _____

Type of Camp- Permanent/ Mobile: _____

Number of People in Camp: _____

How Long has Camp Been Here (if Mobile): _____

Are there any Aircraft on site? If yes, Type: _____

3. History of the Problem:

Date/Time Bear First Sighted: _____

Type of Bear: Grizzly _____ Polar _____ Black _____

Sex of Bear: Male _____ Female _____ Unknown _____

Age of Bear: Cub _____ Juvenile _____ Adult _____

Has Bear Been Observed Before: _____

Den site found (description)?

What was the Bear Attracted To: _____

Did the Bear Obtain Food: _____

Behaviour of Bear: Fearful _____ Not Fearful _____ Aggressive _____

Damage By Bear: _____

4. Deterrent Action:

Was the Bear Deterred? Yes _____ No _____

If Yes, Type of Deterrent Used: _____

Present Status of Bear: _____

5. Other Information:

Reporters Name/Title: _____

Weather on Site at Time of Report: _____

Checklist Forwarded to: _____

From: Wall, Erica
To: EISC;
cc: shirley.maaskant@mgmenergy.com; Conrad Baetz; bdixit@neb-one.gc.ca;
Moggy, Derrick; Stein, Terrance; Dow, Larry;
Subject: West Langley Driling, Completion, Testing and Abandonment 2008-2011
Date: Tuesday, July 15, 2008 2:02:57 PM
Attachments: IN-08-0078 West Langley Drilling nearshore.pdf
OS ice bridge.pdf
Freshwater Intake End-of-Pipe Fish Screen Guideline.pdf
Water Withdrawal Protocol - Jan 05.pdf

Good Afternoon Barb,

Attached is DFO's advice regarding the above project plus three attachements.
The originals will not be sent. Please contact me if there are any concerns.

Erica Wall

Fish Habitat Biologist/ Biologiste pour l'habitat des poissons

Telephone/ Téléphone: (867) 777-7516

Fax/ Télécopieur: (867) 777-7501

erica.wall@dfo-mpo.gc.ca

Western Arctic Area/ Région ouest de L'Arctique

Fisheries & Oceans Canada/ Pêches et Océans Canada

Po Box/ Boîtes postale 1871 Inuvik, NT, X0E 0T0



Fisheries and Oceans Canada Pêches et Océans Canada

P. O. Box 1871
Inuvik, Northwest Territories
X0E 0T0

Your file Votre référence

July 15, 2008

Our file Notre référence
08-HCAA-CA6-00078

Ms. Barb Chalmers
Environmental Impact Screening Committee
P.O. Box 2120
Inuvik, Northwest Territories
X0E0T0

Dear Ms. Chalmers:

Subject: West Langley Drilling, Completion, Testing and Abandonment 2008-2011

Fisheries and Oceans Canada - Fish Habitat Management Program (DFO) received the proposal put forth by MGM Energy Corporation, on June 30, 2008. The proposal has been reviewed to determine whether it is likely to result in impacts to fish and fish habitat which are prohibited by the habitat protection provisions of the *Fisheries Act* or those prohibitions of the *Species at Risk Act* that apply to aquatic species.*

We understand that the proponent plans to:

- Drill, complete, test, and abandon one well over one or two seasons.
- Build an artificial ice island to use as a drill platform in an area of 0.5 to 2 metres of water. This ice island may or may not be attached to the pre-existing artificial island within the area.
- Use a mud-line suspension technique for drilling that involves capping the pipe approximately one metre below the sea floor.
- Freeze barges in the Mackenzie River for equipment and fuel storage.
- Construct ice roads for access to the well site area.
- Establish a camp to accommodate approximately 75 people during the project.
- Create a temporary storage area for drilling waste on site where the material will freeze and can be broken up and handled easier for disposal.
- Treat wastewater to applicable standards before disposal.
- Complete all work between November and April 2008 though 2011.

To reduce potential impacts to fish and fish habitat we are recommending the following mitigation measures be included into the proposed plans:

*Those sections most relevant to the review of development proposals include 20, 22, 32 and 35 of the *Fisheries Act* and sections 32, 33 and 58 of the *Species at Risk Act*. For more information please visit www.dfo-mpo.gc.ca.

1. Excessive winter water withdrawals can lead to the loss of fish and fish habitat. Please refer to the DFO Protocols for Winter Withdrawal in the Northwest Territories (January 2005) for methods to evaluate available water capacity in lakes and for mitigation methods. DFO does not recommend the use of streams as a water source.
2. Water intakes should be properly screened and be equipped with fine mesh of 2.54 mm (1/10") to prevent the entrainment and/or impingement of fish. Please refer to the Freshwater Intake End-of-Pipe Fish Screen Guideline (DFO, 1995).
3. The construction of temporary crossings over ice-covered streams is conducted as specified in the attached Ice Bridges Operational Statement. This Operational Statement provides specific advice on ice bridge construction, maintenance and removal. If it is determined that the conditions and measures described in the Operational Statement can not be complied with, DFO should be contacted with the details of the project.
4. The treated waste water should be discharged over land in a dispersed application rather than directly onto the Mackenzie River or any other water body.
5. The use of biodegradable drill additives is encouraged over non-biodegradable types.
6. All drilling muds and other additives should be certified as non-toxic.
7. Fuel storage should have secondary containment (such as doubled walled tanks, berms etc.) that is sufficient to ensure that fuel will not be able to enter any water body.
8. DFO encourages MGM Energy to use double hulled barges when freezing storage units in the Mackenzie River over winter.
9. Barges to be frozen in place over winter and used for storage should be emptied of all fuel and as much equipment as possible while awaiting river break up.
10. Every possible effort should be made to locate the drill site on the pre-existing artificial island in order for the well head to be on land.
11. Should the artificial island prove impossible to use and a manufactured ice island is necessary every effort should be made to ensure that the entire island is set completely on bottom fast ice. DFO should be contacted if this not possible and the ice island is to be located on ice not frozen to the bottom.

Provided that the additional mitigation measures described above are incorporated into the proposed plans, DFO has concluded that the proposal is not likely to result in impacts to fish and fish habitat.

The proponent will not need to obtain a formal approval from DFO in order to proceed with the proposal.

Please ensure that this office is notified at least 10 days before starting the work. A copy of this letter should be kept on site while the work is in progress.

If the plans have changed or if the description of the proposal is incomplete the proponent should contact this office to determine if the advice in this letter still applies.

Please be advised that any impacts to fish and fish habitat which result from a failure to implement the proposal as described or incorporate the additional mitigation measures included in this letter could lead to corrective action such as enforcement.

If you have any questions please contact the undersigned at (867) 777-7516, by fax at (867) 777-7501, or by email at Erica.Wall@dfo-mpo.gc.ca.

Yours sincerely,

Erica Wall

Erica Wall
Habitat Biologist

Copy: Shirley Maaskant, MGM Energy Corp
Rudy Cockney, NWT Water Board
Conrad Baetz, INAC Inuvik
Bharat Dixit, National Energy Board
Derrick Moggy, DFO Yellowknife
Terry Stein, C&P, DFO Inuvik
Larry Down, DFO Inuvik



ICE BRIDGES AND SNOW FILLS

Version 3.0

Ice bridges and snow fills are two methods used for temporary winter access in remote areas. Ice bridges are constructed on larger watercourses that have sufficient stream flow and water depth to prevent the ice bridge from coming into contact with the stream bed or restricting water movement beneath the ice. Snow fills, however, are temporary stream crossings constructed by filling a stream channel with clean compacted snow.

Ice bridge and snow fill crossings provide cost-effective access to remote areas when lakes, rivers and streams are frozen. Since the ground is frozen, ice bridges and snow fills can be built with minimal disturbance to the bed and banks of the watercourse. However, these crossings can still have negative effects on fish and fish habitat. Clearing shoreline and bank vegetation increases the potential for erosion and instability of the banks and can lead to deposition of sediments into fish habitat. There is also potential for blockage of fish passage during spring break-up.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with the subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to incorporate into your project in order to avoid negative impacts to fish habitat. You may proceed with your ice bridge or snow fill project without a DFO review when you meet the following conditions:

- your planned work is not located in a critical area, as identified in a NWT Community Conservation Plan or other applicable land use plan,
- ice bridges are constructed of clean (ambient) water, ice and snow,
- snow fills are constructed of clean snow, which will not restrict water flow at any time,
- the work does not include realigning the watercourse, dredging, placing fill, or grading or excavating the bed or bank of the watercourse,
- materials such as gravel, rock and loose woody material are NOT used,
- where logs are required for use in stabilizing shoreline approaches, they are clean and securely bound together,

and they are removed either before or immediately following the spring freshet,

- the withdrawal of any water will not exceed 10% of the instantaneous flow, in order to maintain existing fish habitat,
- water flow is maintained under the ice, where this naturally occurs,
- this Operational Statement is posted at the work site and is readily available for reference by workers, and
- you incorporate the *Measures to Protect Fish and Fish Habitat when Constructing an Ice Bridge or Snow Fill* listed below in this Operational Statement.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in the violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact the DFO office in your area if you wish to obtain DFO's opinion on the possible options you should consider to avoid contravention of the *Fisheries Act*.

You are required to respect all local, municipal, territorial or federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with the *Species at Risk Act* (www.sararegistry.gc.ca). If you have questions regarding this Operational Statement, please contact the DFO office in your area (see Northwest Territories DFO office list).

We ask that you notify DFO, preferably 10 working days before starting your work by filling out and sending the Northwest Territories Operational Statement notification form (www.dfo-mpo.gc.ca/regions/central/habitat/os-oo/prov-terr/index_e.htm) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when Constructing an Ice Bridge or Snow Fill

1. Use existing trails, winter roads or cut lines wherever possible as access routes to limit unnecessary clearing of additional vegetation and prevent soil compaction.
2. Construct approaches and crossings perpendicular to the watercourse wherever possible.

3. Construct ice bridge and snow fill approaches using clean, compacted snow and ice to a sufficient depth to protect the banks of the lake, river or stream. Clean logs may be used where necessary to stabilize approaches.
4. Where logs are used to stabilize the approaches of an ice bridge or snow fill:
 - 4.1. The logs are clean and securely bound together so they can be easily removed.
 - 4.2. No logs or woody debris are to be left within the water body or on the banks or shoreline where they can wash back into the water body.

Note: The use of material other than ice or snow to construct a temporary crossing over any ice-covered stream is prohibited under section 11 of the *Northwest Territories Fishery Regulations*, unless authorized by a Fishery Officer. Please contact the nearest NWT DFO office.

5. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to accommodate the road. This removal should be kept to a minimum and within the road right-of-way.
6. Install sediment and erosion control measures before starting work to prevent the entry of sediment into the watercourse. Inspect them regularly during the course of construction and decommissioning activities and make all necessary repairs if any damage occurs.
7. Operate machinery on land or on ice and in a manner that minimizes disturbance to the banks of the lake, river or stream.
 - 7.1. Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
 - 7.2. Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water or spreading onto the ice surface.
 - 7.3. Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
 - 7.4. Restore banks to original condition if any disturbance occurs.
8. If water is being pumped from a lake or river to build up the bridge, follow DFO's *NWT Winter Water Withdrawal Protocol* (available from the DFO offices listed below), and ensure that the intakes are sized and adequately screened to prevent debris blockage and fish mortality (refer to DFO's *Freshwater Intake End-of-Pipe Fish Screen Guideline* (1995) available at www.dfo-mpo.gc.ca/Library/223669.pdf).
9. Crossings do not impede water flow at any time of the year.

10. When the crossing season is over and where it is safe to do so, create a v-notch in the centre of the ice bridge to allow it to melt from the centre and also to prevent blocking fish passage, channel erosion and flooding. Compacted snow should be removed from snow fills prior to the spring freshet.
11. Stabilize any waste materials removed from the work site to prevent them from entering the lake, river, or stream. This could include covering spoil piles with biodegradable mats or tarps or planting them with grass or shrubs.
12. Vegetate and stabilize (e.g., cover exposed areas with erosion control blankets or tarps to keep the soil in place and prevent erosion) any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses. Cover such areas with mulch to prevent erosion and to help seeds germinate. If re-vegetation is not possible due to climatic extremes and/or lack of appropriate seed or stock, the site should be stabilized using effective sediment and erosion control measures. In areas with permafrost, care should be exercised to ensure these measures do not cause thawing or frost heave.
 - 12.1. Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved or until such areas have been permanently stabilized by other effective sediment and erosion control measures, in the event that re-vegetation is not possible.

FISHERIES AND OCEANS CANADA OFFICES IN NORTHWEST TERRITORIES

Yellowknife Area Office
 Fisheries and Oceans Canada
 Suite 101 – Diamond Plaza
 5204 – 50th Ave.
 Yellowknife, NT X1A 1E2
 Phone: (867) 669-4900
 Fax: (867) 669-4940

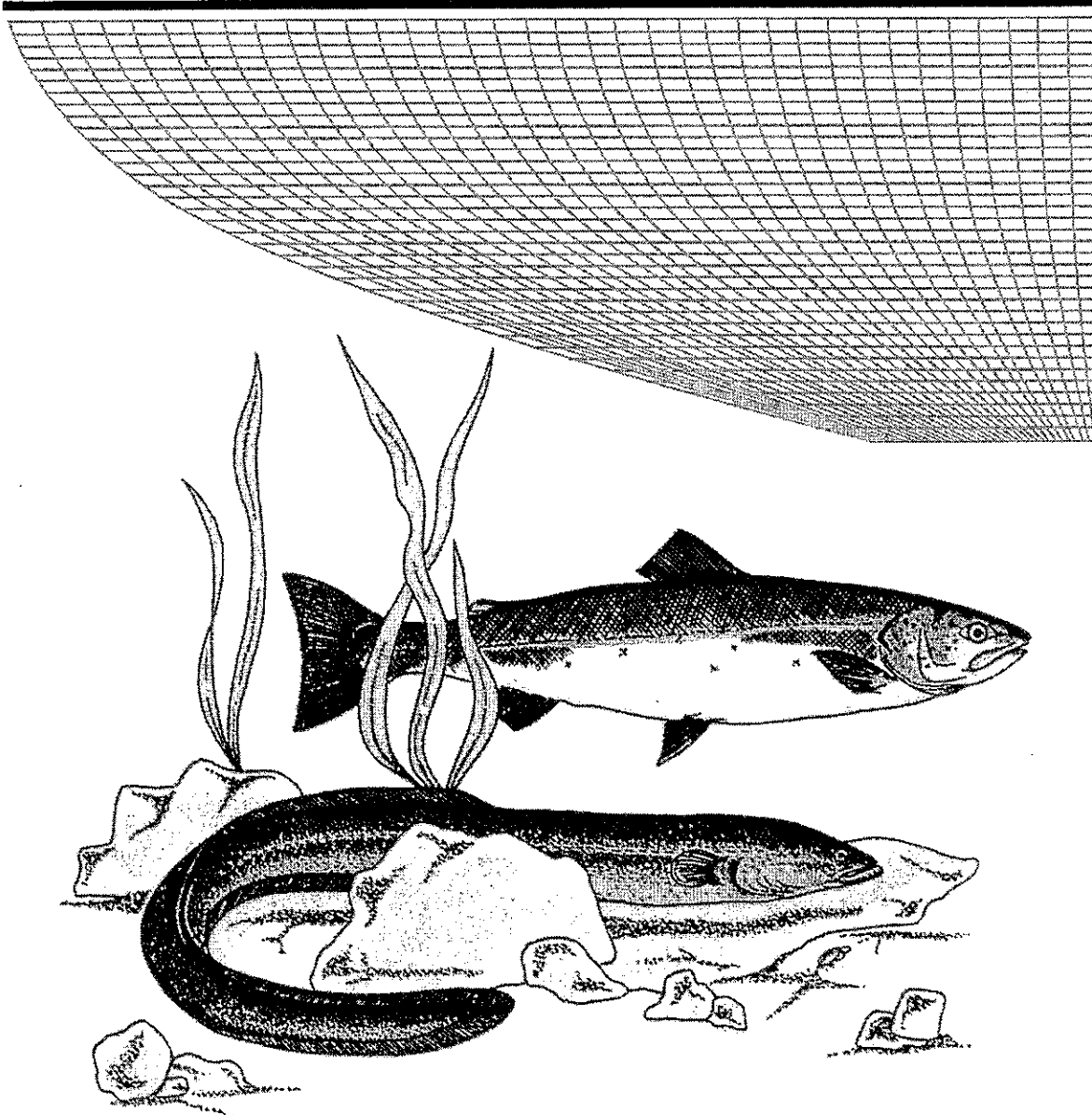
Inuvik District Office
 Fisheries and Oceans Canada
 Box 1871
 Inuvik, NT X0E 0T0
 Phone: (867) 777-7500
 Fax: (867) 777-7501

Aussi disponible en français

http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp

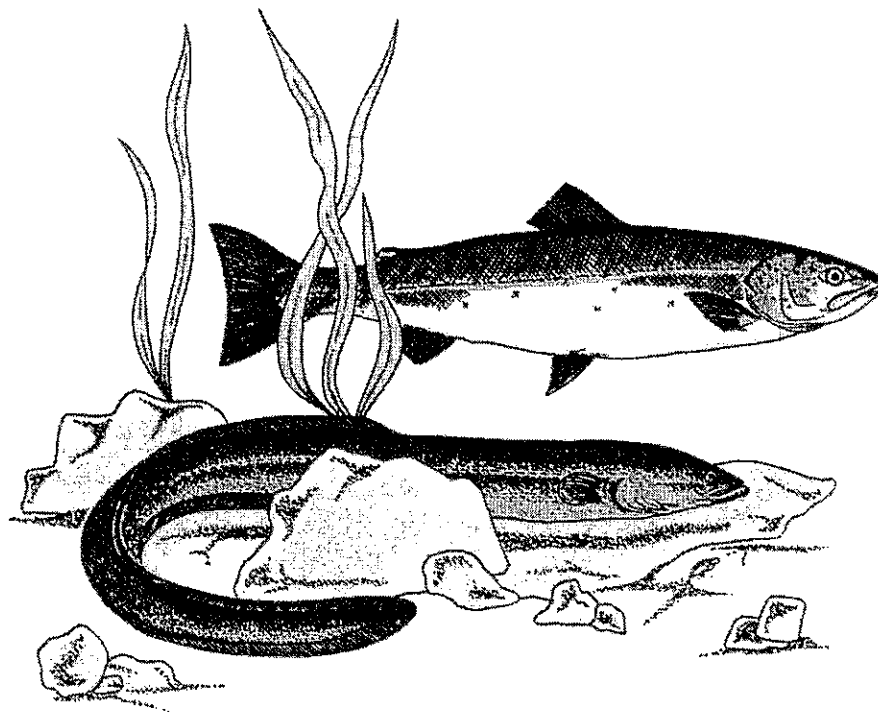
Department of Fisheries and Oceans

Freshwater Intake End-of-Pipe Fish Screen Guideline



Department of Fisheries and Oceans

Freshwater Intake End-of-Pipe Fish Screen Guideline



Published by:

Communications Directorate
Department of Fisheries and Oceans
Ottawa, Ontario
K1A 0E6

DFO / 5080
© Minister of Supply and Services Canada 1995

ISBN 0-662-23168-6

Catalogue No. Fs 23-270 / 1995E



Printed on recycled paper

Table of Contents

1.0	Introduction	1
2.0	Guideline Objective	1
3.0	Information Requirements for Evaluation of Intake Screens	3
4.0	Design, Installation, and Maintenance of Freshwater intake End-of-Pipe Fish Screens	3
4.1	Fish Screen Criteria	4
4.2	Design of Fixed End-of-Pipe Fish Screens	6
4.3	Installation	8
4.4	Cleaning and Maintenance	15
	References	17
	Glossary	19
	Appendix A: Information Requirements	21
	Appendix B: Sample Calculation	23
	Appendix C: Units of Conversion	25
	Appendix D: DFO Regional Contacts	27

List of Figures

Figure 1 - Open Screen Areas for End-of-Pipe Water Intake Flows	9
Figure 2 - Common Screen Shapes and Area Formulae	10
Figure 3 - Typical Applications and Features of End-of-Pipe Screens	11
Figure 4 - Examples of Typical Screen and Material Types	12
Figure 5 - Examples of Typical Installations of End-of-Pipe Screens	13

List of Tables

Table 1 - Summary of Common Fish Species and Swimming Modes	5
Table 2 - Open Screen Area Required for End-of-Pipe Water Intakes	7
Table 3 - Examples of Screen Material	7

1.0

Introduction

The Department of Fisheries and Oceans (DFO) has prepared the **Freshwater Intake End-of-Pipe Fish Screen Guideline** to assist proponents in the design and installation of fish screens for the protection of anadromous and resident fish where freshwater is extracted from fish-bearing waters. This guideline will also assist regulatory agencies in the review of fish screen proposals.

A requirement for fish screening is stated under Section 30 of the *Fisheries Act*, where every water intake, ditch, channel, or canal in Canada constructed or adapted for conducting water from any Canadian fisheries waters must provide for a fish guard or a screen, covering, or netting over the entrance or intake so as to prevent the passage of fish into such water intake, ditch, channel or canal. Other sections of the *Fisheries Act*, or other Federal, Provincial, or Municipal Legislation and Policy may also apply to associated water extraction activities. Proponents are advised to contact the appropriate regulatory agencies regarding approvals or permits.

2.0

Guideline Objective

The objective of the guideline is to provide a National standard-of-practice and guidance for end-of-pipe fish screens at freshwater intakes to prevent potential losses of fish due to entrainment or impingement. Entrainment occurs when a fish is drawn into a water intake and cannot escape. Impingement occurs when an entrapped fish is held in contact with the intake screen and is unable to free itself. The severity of the impact on the fisheries resource and habitat depends on the abundance, distribution, size, swimming ability, and behaviour of the organisms in the vicinity of the intake, as well as, water velocity, flow and depth, intake design, screen mesh size, installation and construction procedures and other physical factors.

The **Freshwater Intake End-of-Pipe Fish Screen Guideline** deals exclusively with the sizing and design of fixed screens that are often placed at the end of a pipe used to extract water up to 0.125 m/s, or 125 litres per second (L/s) (i.e., 2000 US gallons per minute (US gpm)). The guideline is intended for use in addressing fish screens for small permanent and temporary withdrawals for irrigation, construction, small municipal and

private water supplies, etc. It is *not* intended for application to hydroelectric or canal screen designs; however, such proposals can be considered by regulatory agencies on a site-specific basis. The guideline focuses on the technical aspects of intake screens and the protection of fish rather than on policy, legislation, or environmental assessment processes and their application. This guideline has been developed to provide protection of freshwater fish with a minimum fork length of 25 mm (approximately 1 inch) since most eggs and fish larvae remain in bottom substrates until they reach the fry stage (i.e., 25 mm fork length). Other designs, in addition to intake screens, may be appropriate to address fish and fish habitat protection associated with water withdrawals. Such proposed designs should be addressed with the appropriate regulatory agencies on a site-specific basis.

[illegible]

3.0

Information Requirements for Evaluation of Intake Screens

Information that should be provided to facilitate evaluation of an end-of-pipe intake screen design intended for fish protection during a freshwater withdrawal is highlighted below. Types of information requirements that may also be applicable to the water intake project as a whole are identified in Appendix A.

- fish presence, species, and possible fish size or fish habitat conditions at the project site
- rate or ranges of rates of withdrawal from the watercourse
- screen open and effective areas
- physical screen open parameters with respect to the intake and the watercourse
- screen material, method of installation and supporting structures
- screen maintenance, cleaning, or other special requirements

4.0

Design, Installation, & Maintenance of Freshwater Intake End-of-Pipe Fish Screens

The appropriate design of a fish screen is largely dependent upon the species and the size of fish requiring protection. Appropriate installation and maintenance/cleaning of the screen are also important in keeping approach velocities low and ensuring satisfactory operation of the screen. For the purposes of this guideline, emphasis is placed on the protection of freshwater fish with a minimum fork length of 25 mm from entrainment and impingement due to water extraction activities. Depending upon site-specific circumstances, a case may be made whereby the minimum fork length size of fish to be protected is greater than 25 mm. In this instance, the fish screen criteria for open screen area (Table 2 and Figure 1) and screen mesh size (2.54 mm) presented here do not apply. Fish screen criteria and guidance for the protection of fish larger than 25 mm is provided by Katopodis (1992).

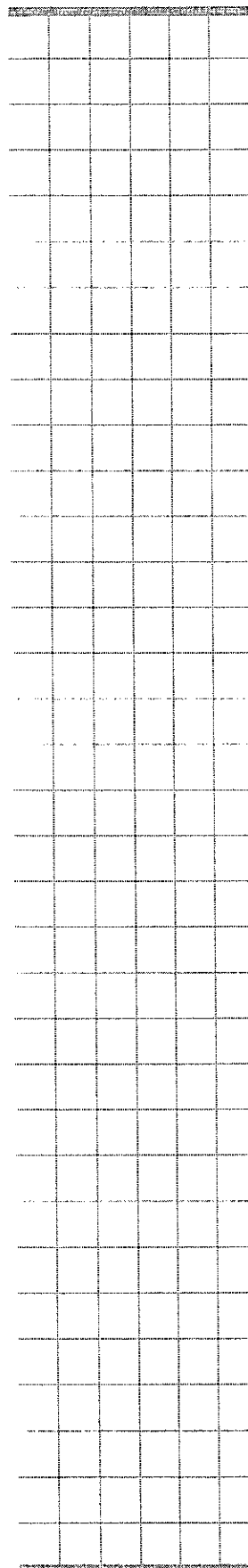
The following sections address the appropriate design of fixed freshwater intake end-of-pipe fish screens for the protection of fish with a minimum fork length of 25 mm. Guidance on

installation, cleaning, and maintenance is provided. Common types of intake screens and associated intakes are also presented. Appendix B presents a sample calculation utilizing the guideline to determine the appropriate end-of-pipe intake screen size for the protection of freshwater fish.

4.1 Fish Screen Criteria

To protect fish from impingement or entrainment, the approach velocity (i.e., the water velocity into, or perpendicular to, the face of an intake screen) should not exceed certain values based on the swimming mode (i.e., subcarangiform or anguilliform) of the fish present in the watercourse. The subcarangiform group includes fish that swim like a trout or salmon, and move through the water by undulating the posterior third to half of their bodies. The anguilliform group includes fish that swim like an eel, and move through the water by undulating most or all of their body. Table 1 presents the swimming modes of most common fish species in Canada. Contact DFO or provincial fisheries agencies regarding fish species that are not included in Table 1.

Envelope curves for approach velocities were developed for each swimming mode corresponding to a minimum fork length of 25 mm and a maximum endurance time of 10 minutes (the time the fish is in front of the face of the screen before it can elude it). To satisfy approach velocities of approximately 0.11 m/s and 0.038 m/s for the subcarangiform and anguilliform groups respectively, curves indicating the required open screen areas, based on fish swimming performance data, including fish species and size (Katopodis, 1990) and related to flows/extractions, were developed. Table 2 presents the required open screen area, in both metric and non-metric units, for end-of-pipe intake screens with a capacity up to 125 L/s (2000 US gpm). The open screen area is the area of all open spaces on the screen available for the free flow of water. The same information is presented graphically in Figure 1.



C

ANGUILLIFORM SWIMMING MODE

Common Name	Scientific Name
American Eel	<i>Anguilla rostrata</i>
Burbot	<i>Lota lota</i>
Sea Lamprey	<i>Petromyzon marinus</i>

4.2 Design of Fixed End-of-Pipe Fish Screens

Once the required open area has been found from Table 2 or Figure 1, the effective screen area must be calculated. It is the area occupied by the open spaces (i.e., open screen area) and the screen material available for the free flow of water. The effective screen area should be provided at the intake location and is determined as follows:

$$\text{Effective Screen Area (m}^2 \text{ or ft}^2\text{)} = \frac{\text{Open Screen Area (Table 2)}}{\left(\frac{\% \text{ Open Area (Table 3)}}{100} \right)}$$

It should be noted that if the percent (%) open screen area is maximized, then the effective screen area required for a given flow is minimized. The narrowest dimension of any opening on the screen is referred to as the design opening, regardless of opening shape. The maximum design opening for a fish of 25 mm fork length is estimated at 2.54 mm (0.10 inches). Guidance on screen openings and materials is presented below.

- The screen openings may be round, square, rectangular, or any combination thereof, but should not have any protrusions that could injure fish.
- Screen materials may include brass, bronze, aluminum, monel metal, galvanized or stainless steel, and plastics. The screen material should be resistant to corrosion and UV light.
- Note: clogging due to corrosion is minimized with the use of stainless steel.
- Welded wedge wire screens offer reduced debris clogging and increased open area and screen stiffness, in comparison to round wire mesh and punch plate.

Table 3 presents several common types of screening material that meet the requirements of wire diameter, clear opening width and percent open area,

The dimensions of the fish screen can be calculated after the correct shape, configuration, location, and method of installation have been determined. This will usually be determined after a site investigation and a review of these guidelines. Included in Figure 2 are common screen shapes and the associated

Table 2

**Open Screen Area
Required for End-
of-Pipe Water
Intakes**

Metric Units

Non-Metric Units

Flow (L/s)	Subcarangiform (m ²)	Anguilliform (m ²)	Flow (US gpm)	Subcarangiform (ft ²)	Anguilliform (ft ²)
1	0.01	0.03	10	0.1	0.2
5	0.05	0.13	50	0.3	0.9
6	0.06	0.16	100	0.6	1.8
8	0.07	0.21	150	0.9	2.7
10	0.09	0.26	200	1.3	3.6
12	0.11	0.31	250	1.6	4.5
14	0.13	0.37	300	1.9	5.4
15	0.14	0.39	350	2.2	6.2
16	0.15	0.42	400	2.5	7.1
18	0.17	0.47	450	2.8	8.0
20	0.18	0.52	500	3.2	8.9
22	0.20	0.58	550	3.5	9.8
24	0.22	0.63	600	3.8	10.7
25	0.23	0.65	650	4.1	11.6
26	0.24	0.68	700	4.4	12.5
28	0.26	0.73	750	4.7	13.4
30	0.28	0.79	800	5.0	14.3
32	0.30	0.84	850	5.4	15.2
34	0.31	0.89	900	5.7	16.0
35	0.32	0.92	950	6.0	16.9
36	0.33	0.94	1000	6.3	17.8
38	0.35	0.99	1050	6.6	18.7
40	0.37	1.05	1100	6.9	19.6
45	0.42	1.18	1150	7.2	20.5
50	0.46	1.31	1200	7.6	21.4
55	0.51	1.44	1250	7.9	22.3
60	0.55	1.57	1300	8.2	23.2
65	0.60	1.70	1350	8.5	24.1
70	0.65	1.83	1400	8.8	25.0
75	0.69	1.96	1450	9.1	25.8
80	0.74	2.09	1500	9.4	26.7
85	0.78	2.23	1550	9.8	27.6
90	0.83	2.36	1600	10.1	28.5
95	0.88	2.49	1650	10.4	29.4
100	0.92	2.62	1700	10.7	30.3
110	1.02	2.88	1750	11.0	31.2
120	1.11	3.14	1800	11.3	32.1
125	1.16	3.30	1850	11.6	33.0
			1900	12.0	33.9
			1950	12.3	34.8
			2000	12.6	35.7

Table 3

**Examples of Screen
Material**

Material	Wire Thickness	Opening Width	% Open Area
8x 8 Stainless Steel Alloy Mesh	0.711 mm (0.028")	2.44 mm (0.096")	60
#7 Mesh Wire Cloth	1.025mm (0.041")	2.54 mm (0.100")	51
#8 Mesh Wire Cloth	0.875 mm (0.035")	2.25 mm (0.089")	52
#8 Mesh Wire Cloth	0.700mm (0.028")	2.54 mm (0.100")	62
#60 Wedge Wire Screen	1.50mm (0.059")	2.54 mm (0.100")	63
#45Wedge Wire Screen	1.10mm (0.080")	2.54 mm (0.100")	69

dimensions and area formulae. These are just examples of the many shapes and sizes in which fish screens can be fabricated. Screens are instream structures and, as such, should have sufficient strength and durability, and be capable of withstanding any potential large forces and impacts. Figure 3, 4, and 5 illustrate some of the various configurations, applications, and screen material types of end-of-pipe fish screens.

4.3 Installation

- Screens should be located in areas and depths of water with low concentrations of fish throughout the year.
- Screens should be located away from natural or man-made structures that may attract fish that are migrating, spawning, or in rearing habitat.
- The screen face should be oriented in the same direction as the flow.
- Ensure openings in the guides and seals are less than the opening criteria to make "fish tight".
- Screens should be located a minimum of 300 mm (12 in.) above the bottom of the watercourse to prevent entrainment of sediment and aquatic organisms associated with the bottom area.
- Structural support should be provided to the screen panels to prevent sagging and collapse of the screen.
- Large cylindrical and box-type screens should have a manifold installed in them to ensure even water velocity distribution across the screen surface. The ends of the structure should be made out of solid materials and the end of the manifold capped.
- Heavier cages or trash racks can be fabricated out of bar or grating to protect the finer fish screen, especially where there is debris loading (woody material, leaves, algae mats, etc.). A 150 mm (6 in.) spacing between bars is typical.

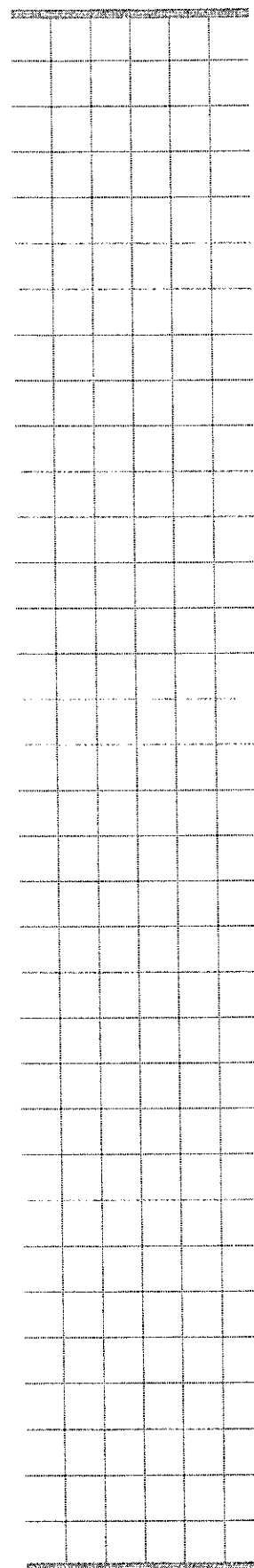


Figure 1
Open Screen Area
for End-of-Pipe
Water Intake Flow

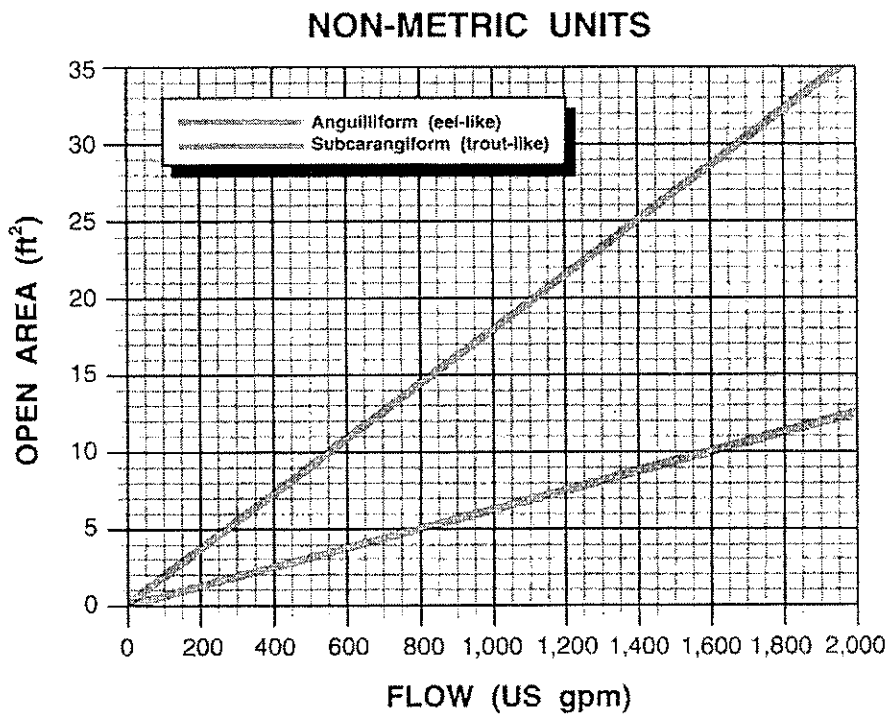
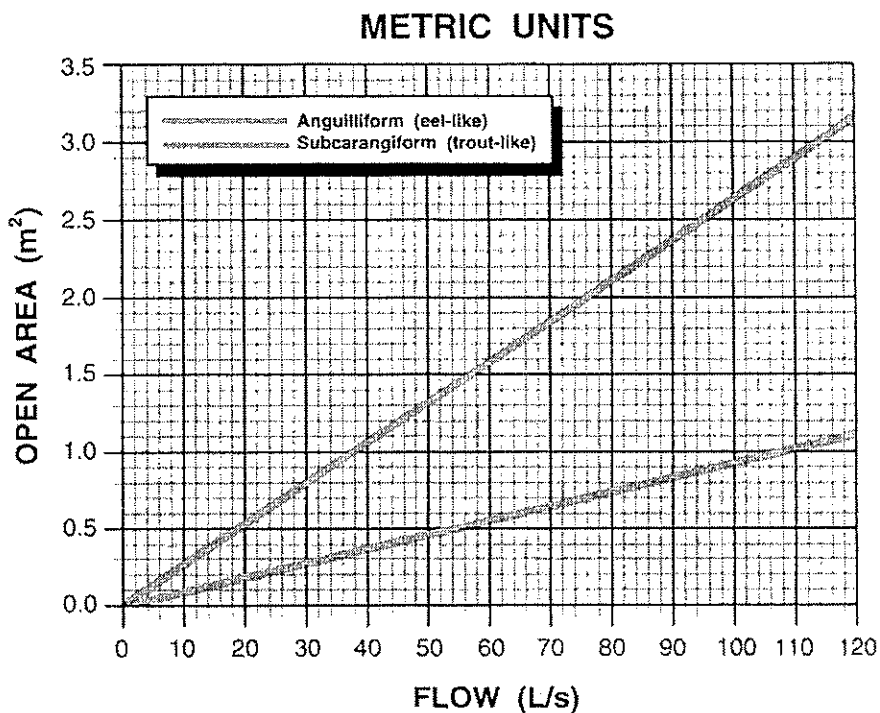
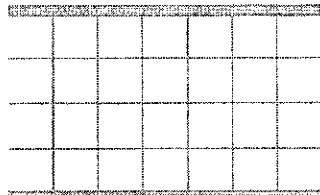
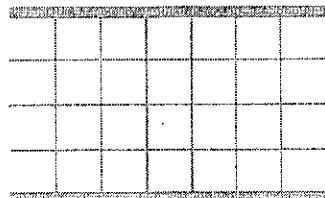
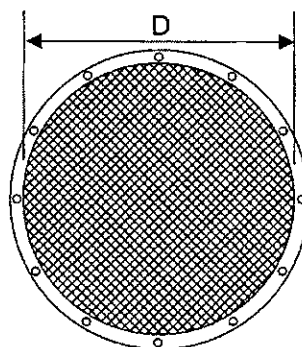


Figure 2
Common Screen
Shapes and Area
Formulae

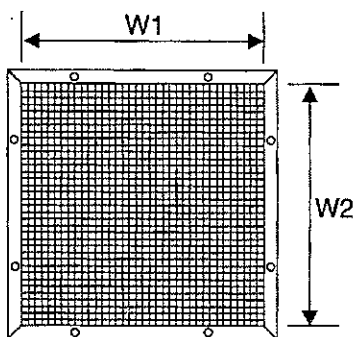


CIRCULAR SCREEN



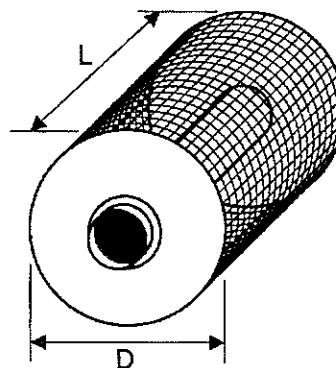
$$\text{Area} = \frac{\pi}{4} D^2$$

SQUARE SCREEN



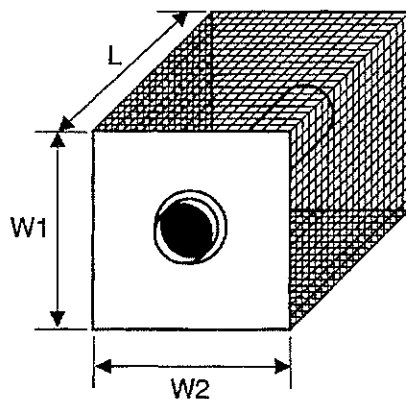
$$\text{Area} = W1 \times W2$$

CYLINDRICAL SCREEN



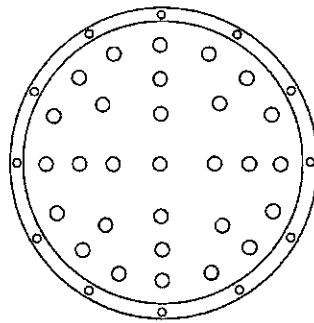
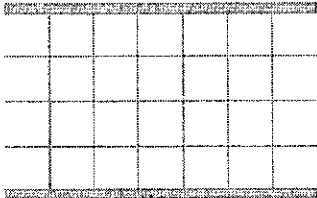
$$\text{Area} = \pi DL$$

BOX SCREEN

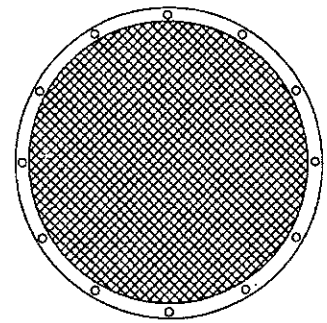


$$\text{Area} = 2L(W1 + W2)$$

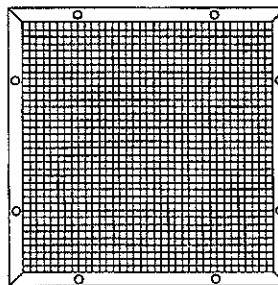
Figure 3
Typical Applications
and Features of
End-of-Pipe Screens



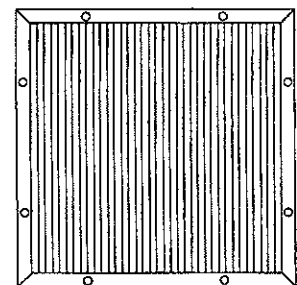
**PERFORATED PLATE
(PUNCHED)**



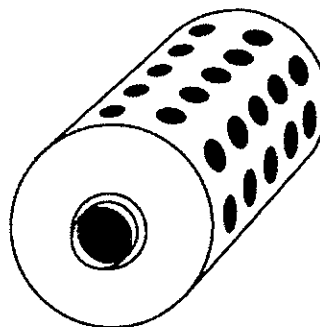
**CIRCULAR MESH
SCREEN**



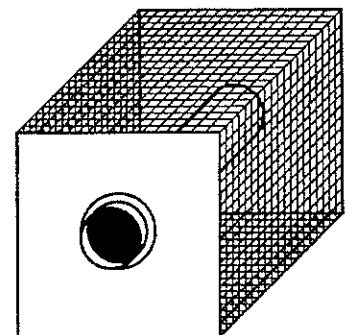
**SQUARE MESH
SCREEN**



**SQUARE WEDGE WIRE
SCREEN**

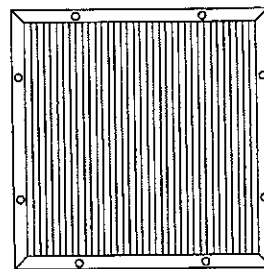
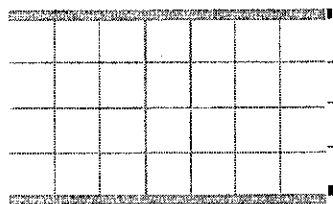


**DRUM OR CYLINDER
WITH PERFORATED PIPE**

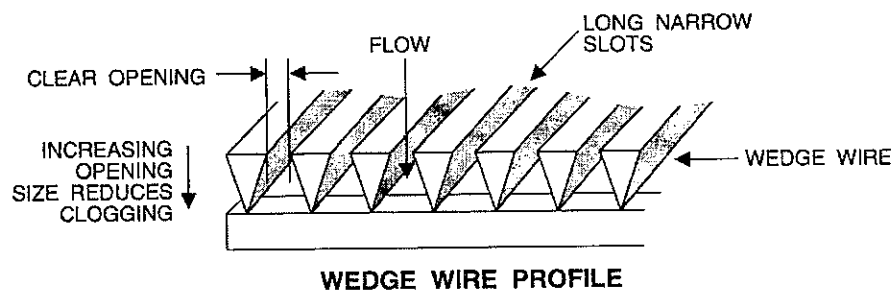


**BOX-TYPE WITH
MESH SCREEN**

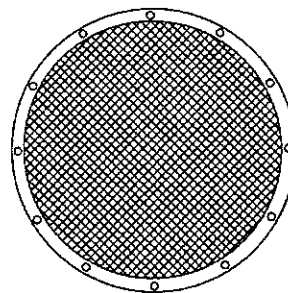
Figure 4
Examples of Typical
Screen and Material
Types



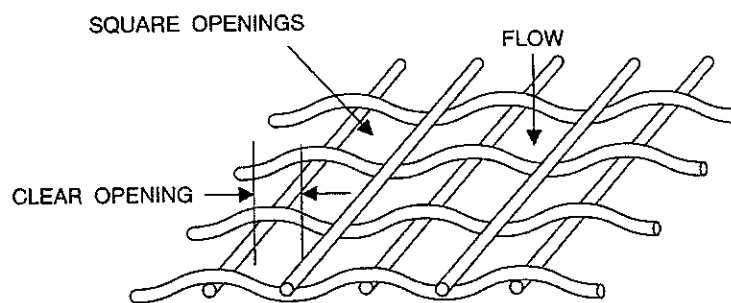
SQUARE WEDGE WIRE SCREEN



WEDGE WIRE PROFILE

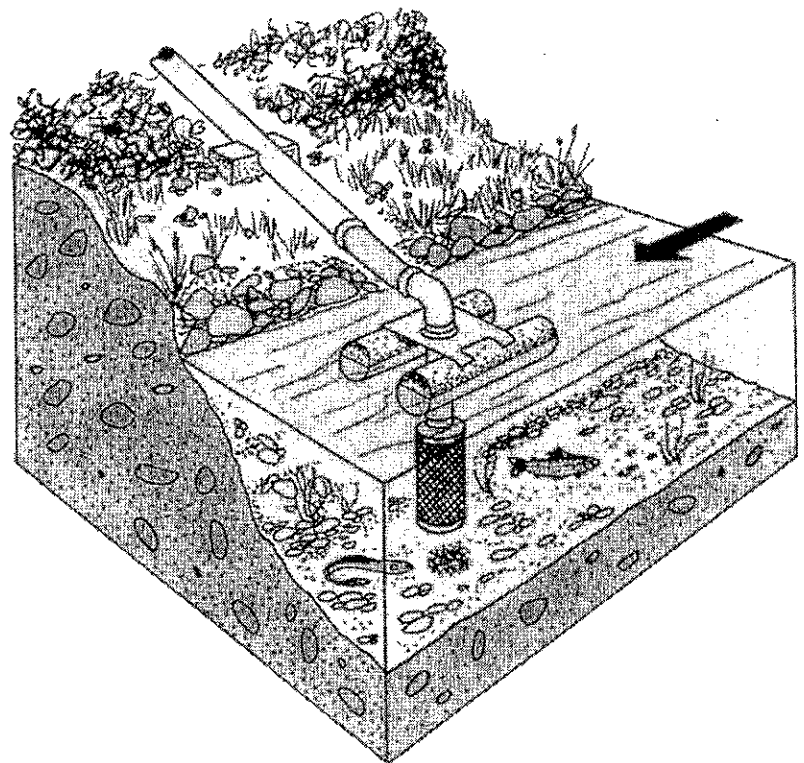
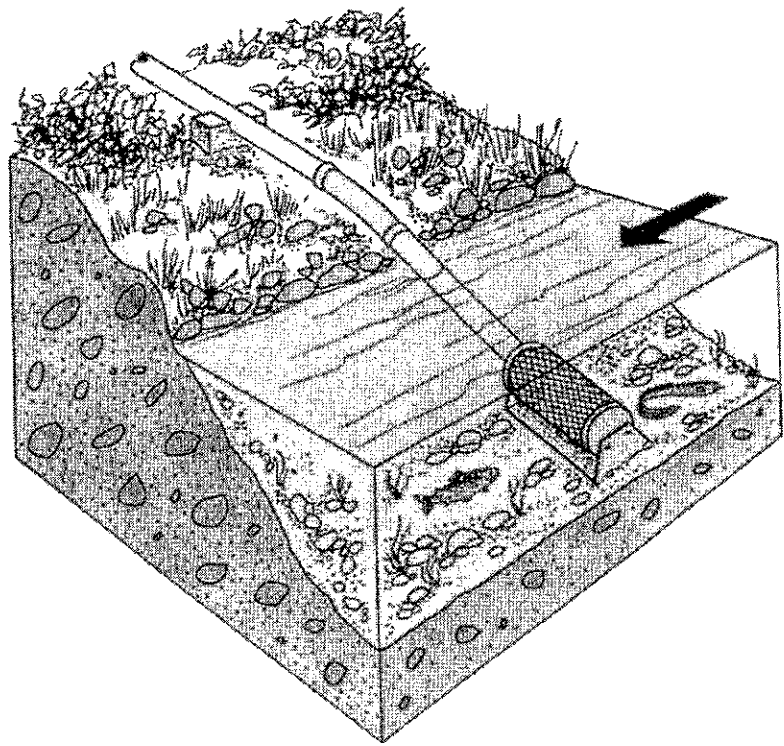
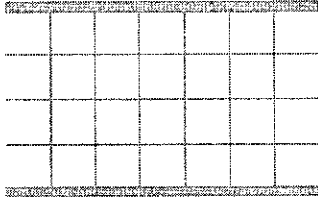


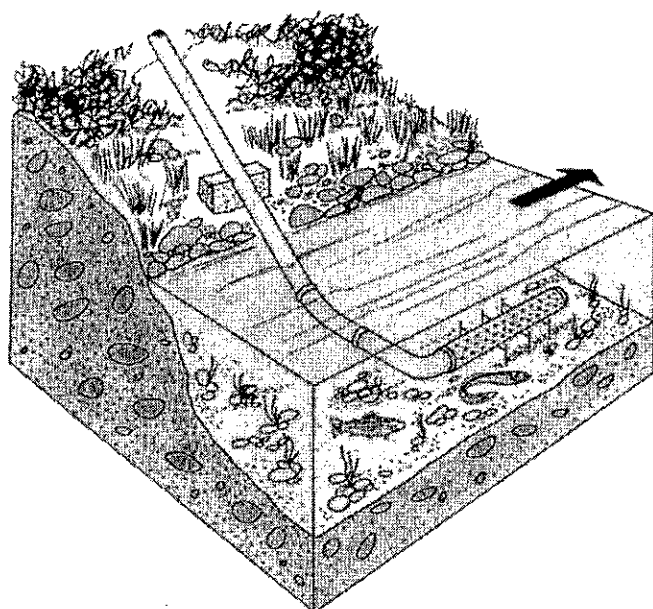
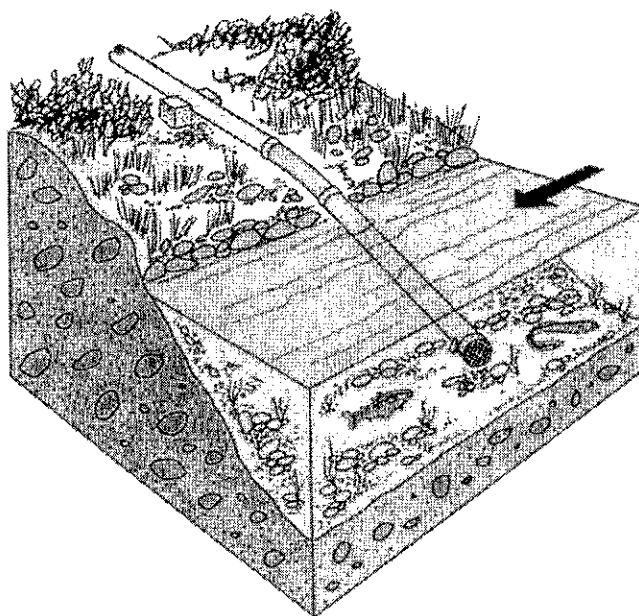
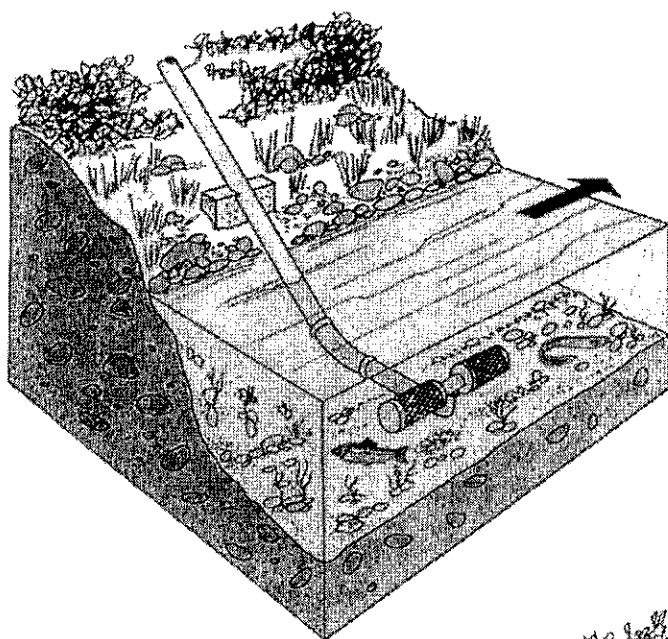
CIRCULAR MESH SCREEN



WOVEN WIRE MESH PROFILE

Figure 5
Examples of Typical
Installations of End-
of-Pipe Screen





4.4 Cleaning and Maintenance

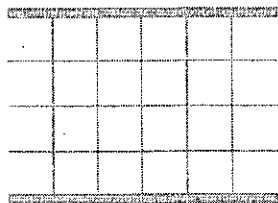
- Provision should be made for the removal, inspection, and cleaning of screens.
- Ensure regular maintenance and repair of cleaning apparatus, seals, and screens is carried out to prevent debris-fouling and impingement of fish.
- Pumps should be shut down when fish screens are removed for inspection and cleaning.
- Screens may be cleaned by methods such as air or water, backwashing, removal and pressure washing or scrubbing.
- Under certain site-specific winter conditions, it may be appropriate to remove screens to prevent screen damage.
- Flexible suction pipe may be used instead of solid, fixed piping for ease of screen removal and cleaning.
- Pump suction pressure can be measured to assess the need for screen cleaning.

To facilitate intake screen cleaning/maintenance, design and installation features such as orientation of the screen (e.g., in a cove) or variation in mesh shape (i.e., square wire/bars versus round wire/bars), etc. may be considered for regularly cleaned screens. For screens that will not be cleaned regularly, provision of considerably more open screen area (e.g., four times more) than determined from Table 2/Figure 1 may be considered. Such design/installation features should be addressed with the appropriate regulatory agencies on a site-specific basis.

Appendix C presents a list of units of conversion.

For more information on the appropriate design of freshwater intake end-of-pipe fish screens, contact the nearest DFO office. In addition, a list of DFO Regional contacts is presented in Appendix D. Other appropriate regulatory agencies should also be contacted.

References



Fish Screening Directive. 1990. Department of Fisheries and Oceans, Ottawa, Ontario,

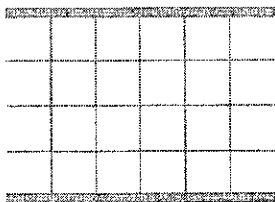
Katopodis, C. 1990. *Advancing the art of engineering fishways for upstream migrants*. Proceedings of International Symposium on Fishways '90, Oct. 8-10, 1990, Gifu, Japan, p. 19-28.

Katopodis, C. 1992. *Fish screening guide for water intakes*. Working Document, Freshwater Institute, Winnipeg, Manitoba.

Katopodis, C. 1994. *Analysis of ichthyomechanical data for fish passage or exclusion system design*. Proc. International Fish Physiology Symposium, July 16-21, 1994, Vancouver, B.C. American Fisheries Society and Fish Physiology Association.

Katopodis, C. and R. Gervais, 1991. *Ichthyomechanics*, Working Document, Department of Fisheries and Oceans, Freshwater Institute, Winnipeg, Manitoba.

Glossary



Anadromous:	Fish species that migrate from the sea to freshwater systems in order to spawn.
Anguilliform:	The type of swimming mode for fish that swim like an eel, and move through the water by undulating most or all of their body.
Effective Screen Area:	The area occupied by the open spaces (i.e., open screen area) and screen material available for the free flow of water.
Entrainment:	Occurs when a fish is drawn into a water intake and cannot escape.
Fork Length:	The straight line distance measured from the tip of the nose to the fork of the tail of a fish.
Impingement:	Occurs when an entrapped fish is held in contact with the intake screen and is unable to free itself.
Open Screen Area:	The area of all open spaces on the screen available for the free flow of water.
Subcarangiform:	The type of swimming mode for fish that swim like trout or salmon, and move through the water by undulating the posterior third to half of their body.

Appendix A Information Requirements

Appendix A Information Requirements

Types of information requirements that may be applicable to a freshwater intake proposal are highlighted below. While this listing is not intended to be all inclusive, it indicates information that may be necessary to enable regulatory agencies to review a water intake and fish screen proposal. The information highlighted below considers Section 30 and other sections of the *Fisheries Act*. These information requirements may also address other Federal, Provincial, and Municipal legislation and policies.

General and Site Information

- gazette or common name of the watercourse
- location of the watercourse
- type of watercourse (e.g., pond or stream)
- type of water intake
- other activities associated with the development or construction of the intake/screen structure

Biophysical Information

- fish presence, species, and possible fish size or fish habitat conditions at the protect site
- physical description of the watercourse at the intake site, including channel width and depth, direction and velocity of water currents, variations in wafer levels, sediment transport processes, lateral or channel grade movement, debris loading, etc.
- location and position of the intake within the watercourse, including dimensions, alignment, depth in the water column, wetted area, etc.
- description of the site features and characteristics, including site access

Water Use Information

- purpose of water withdrawal

Freshwater Intake End-of-Pipe Fish Screen Guideline

- average rate, or ranges of rates, of withdrawal from the watercourse
- duration and time of withdrawal
- estimates of ranges of flow (i.e., daily, weekly, monthly) in the watercourse during times of withdrawal with dates and times of year (with particular consideration to periods of low flow)
- expected effects of withdrawal on existing watercourse (e.g., drawdown, downstream dewatering, etc)
- description of structures or activities associated with the development of the intake
- whether the application is for a new intake, or re-development or upgrading of an existing structure

Other Information

- site plans/sketches indicating intake site and location (detailed on 1:50,000 topographic map)
- photographs/video of the site are often useful

Fish Screen Information

- screen open and effective areas
- physical screen parameters with respect to the intake and the watercourse
- screen material, method of installation and supporting structures
- screen maintenance, cleaning or other special requirements

Appendix B Sample Calculation

A proponent wishes to withdraw water at a rate of 0.075 m³/s from a nearby pond. The pond supports populations of brown trout, brook trout, and American eel. The intake is proposed to be cylindrical with the ends solid and #60 wedge wire screen around the cylinder.

What size must the intake screen be to satisfy the guideline requirements?

There are 4 steps to finding the answer:

1. Determine the fish swimming mode.
2. Determine the open screen area.
3. Determine the effective screen area.
4. Determine the dimensions necessary to produce the effective screen area.

1. Fish Swimming Mode

The fish swimming mode is found from Table 1. Brook trout and brown trout are listed as subcarangiform swimmers, while the American eel is an anguilliform swimmer.

2. Open Screen Area

Table 2 lists the required open screen area for both subcarangiform and anguilliform swimmers under flows up to 125 L/s (2000 US gpm). To use the table, it is necessary first to convert the flow from cubic metres per second to litres per second.

$$0.075 \frac{\text{m}^3}{\text{s}} \times \frac{1000 \text{ L}}{1 \text{ m}^3} = 75 \frac{\text{L}}{\text{s}}$$

For a flow of 75 L/s, Table 2 indicates that the open screen area must be:

- 0.69 m² for subcarangiform swimmers, and
- 1.96 m² for anguilliform swimmers.

The higher number (1.96 m²) is the more stringent requirement, therefore, it is used in the calculation of effective screen area,

3. Effective Screen Area

The screen material in this case is # 60 Wedge Wire. A review of Table 3 indicates that the % Open Area for this material is 63%. With this value and the previously determined area from Step 2, the following formula is used to determine the Effective Screen Area.

$$\begin{aligned}\text{Effective Screen Area} &= \frac{\text{Open Screen Area}}{\left(\frac{\% \text{ Open Area}}{100}\right)} \\ &= \frac{1.96 \text{ m}^2}{\left(\frac{63}{100}\right)} \\ &= 3.111 \text{ m}^2\end{aligned}$$

4. Dimensions of Intake Screen

Figure 2 lists several common screen shapes and their respective area formulae. For a cylindrical screen where the ends are solid and screening is around the cylinder, the following formula applies:

$$\text{Area} = \pi DL$$

The unknown dimensions are diameter (D) and length (L). These dimensions are determined by choosing a value for one and solving the equation for the other.

If the diameter is 0.600 m, then the length follows as:

$$\text{Area} = \pi DL$$

$$3.111 \text{ m}^2 = (0.600 \text{ m})L$$

$$3.111 \text{ m}^2 = (1.885 \text{ m})L$$

$$L = \frac{3.111 \text{ m}^2}{1.885 \text{ m}}$$

$$L = 1.65 \text{ m}$$

A 0.600 m diameter, 1.65 m long cylindrical screen would meet the design requirements. It should be noted that the dimensions given are representative of the screening area only; they do not include any screen that may be blocked by framing, etc. By comparison, if the pond only supported trout (subcarangiform), a 0.600 m diameter, 0.58 m long cylindrical screen would meet the design requirements.

Appendix C

Units of Conversion

To Convert	Into	Multiply By
cubic feet per second	cubic metres per second	0.0283
cubic feet per second	litres per second	28.3
cubic feet per second	US gallons per minute	448.9
cubic metres per second	cubic feet per second	35.3
cubic metres per second	US gallons per minute	15850
litres per second	cubic feet per second	0.0353
litres per second	cubic feet per minute	2.12
litres per second	cubic metres per second	0.001
litres per second	US gallons per minute	15.85
square metre	square foot	10.76
square metre	square inch	1550
square foot	square metre	0.0929
US gallons per minute	litres per second	0.0631
US gallons per minute	cubic feet per second	0.00223
US gallons per minute	Imperial gallons per minute	0.833
Imperial gallons per minute	litres per second	0.0758

Appendix D
DFO Regional
Contacts

NEWFOUNDLAND REGION	Habitat Management Division P.O. Box 5667 St. John's NF A1C 5X1 Tel: 709-772-6157 Fax: 709-772-5562
--------------------------------	---

GULF REGION	Habitat Management Division P.O. Box 5030 Moncton NB E1C 9B6 Tel: 506-851-6252 Fax: 506-851-6579
--------------------	--

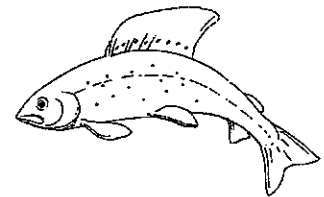
SCOTIA-FUNDY REGION	Habitat Management Division P.O. Box 550 Halifax NS B3J 2S7 Tel: 902-426-6027 Fax: 902-426-1489
--------------------------------	---

QUEBEC REGION	Fish Habitat Management P.O. Box 15550 Quebec QC G1K 7Y7 Tel: 418-648-4092 Fax: 418-648-7777
----------------------	--

CENTRAL & ARCTIC REGION	Habitat Management 501 University Crescent Winnipeg MB R3T 2N6 Tel: 204-983-5181 Fax: 204-984-2404
--	--

PACIFIC REGION	Habitat Management 555 W. Hastings St. Vancouver BC V6B 5G3 Tel: 604-666-6566 Fax: 604-666-7907
-----------------------	---

Local DFO offices should be contacted. Other appropriate regulatory agencies should also be contacted.



DFO Protocol for Winter Water Withdrawal In the Northwest Territories

Rationale

In the Northwest Territories, winter activities such as access road construction, exploratory drilling and camp operations often require large amounts of water. Excessive amounts of water withdrawn from ice covered waterbodies or watercourses can lead to oxygen depletion, loss of over-wintering habitat and/or reductions in littoral habitat. The potential for such negative impacts to over-wintering fish and fish habitat has made winter water withdrawal a critical issue for the Department of Fisheries and Oceans (DFO) in the Northwest Territories. To address the issue of water withdrawal, and to provide standardized guidance to water users, including volume limits for certain water source types, DFO has developed this protocol in conjunction with industry and other regulators.

This protocol pertains to works and activities where a total water volume greater than or equal to (\geq) 100m³ is required from any given waterbody or watercourse during one ice-covered period.

This protocol will **not** apply to the following:

- Winter water withdrawal from the Mackenzie River;
- Any other waterbody or watercourse that is exempted by DFO (i.e. Great Bear Lake, Great Slave Lake, Gordon Lake, and others as and when determined by DFO), and;
- Any waterbody (not including watercourses) from which less than 100m³ is to be withdrawn over the course of one ice-covered period.

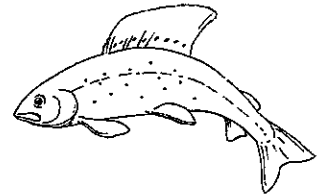
Water Withdrawal from Waterbodies:

For the purposes of this protocol, a **waterbody** is defined as any water-filled basin that is potential fish habitat. A waterbody is defined by the ordinary high water mark of the basin, and excludes connecting **watercourses** (see definition in **Water Withdrawal from Watercourses** below). In order to establish a winter water withdrawal limit for a given waterbody, the following criteria must be adhered to:

1. In one ice-covered season, total water withdrawal from a single waterbody is not to exceed 5% of the available water volume calculated using the appropriate maximum expected ice thickness provided in Table 1.
2. In cases where there are multiple users withdrawing water from a single waterbody, the total combined withdrawal volume is not to exceed 5% of the available water volume calculated using the appropriate maximum expected ice thickness provided in Table 1. Therefore, consistent and coordinated water source identification is essential.
3. Only waterbodies with maximum depths that are ≥ 1.5 m deeper than their corresponding maximum expected ice thickness should be considered for water withdrawal (Table 1). Waterbodies with less than 1.5m of free water beneath the maximum ice are considered to be particularly vulnerable to the effects of water withdrawal.
4. Any waterbody with a maximum expected ice thickness (Table 1) that is greater than, or equal to, its maximum depth (as determined from a bathymetric survey) is exempt from the 5% maximum withdrawal limit.

To further mitigate the impacts of water withdrawal, water is to be removed from deep areas of waterbodies (>2 m below the ice surface) wherever feasible, to avoid the removal of oxygenated surface waters that are critical to over-wintering fish. The littoral zone should be avoided as a water withdrawal location. Water intakes should also be properly screened with fine mesh of 2.54 mm (1/10") and have moderate intake velocities to prevent the entrainment of fish. Please refer to the *Freshwater Intake End-of-Pipe Fish Screen Guideline* (DFO, 1995) which is available upon request, or at the following internet address: www.dfo-mpo.gc.ca/Library/223669.pdf.

In order to determine the maximum water withdrawal volume from an ice-covered waterbody and thereby conform to this protocol, the following information must be provided to DFO for review and concurrence, prior to program commencement.



DFO Protocol for Winter Water Withdrawal In the Northwest Territories

Water Source Identification

1. Proposed primary and secondary access routes for all project activities, with proposed water source and crossing locations clearly identified on a map, with geographical coordinates (latitude/longitude and/or UTM) included.
2. Documented watercourse connectivity (permanently flowing and/or seasonal) between the proposed water source and any other waterbody or watercourse.
3. Aerial photos or satellite imagery of the water sources if available.
4. Estimated total water withdrawal requirement for work or activity and estimated total water withdrawal per water source (in m³).

Bathymetric Survey Results

1. For all waterbodies: One longitudinal transect, connecting the two farthest shorelines, is to be conducted regardless of waterbody size. **Note: a longitudinal transect may be straight or curved in order to accommodate the shape of a lake (see Figure 1).**
2. For waterbodies equal to or less than 1km in length: a minimum of one longitudinal transect and two perpendicular transects are to be conducted. Perpendicular transects should be evenly spaced on the longest longitudinal transect, dissecting the lake into thirds (Figure 1).
3. For lakes greater than 1km in length: a minimum of one longitudinal transect is to be conducted. Perpendicular transects (min. of 2) should be evenly spaced on the longest longitudinal transect at maximum intervals of 500m.
4. Additional transects should be run as required to include irregularities in waterbody shape such as fingers or bays (Figure 1).
5. All longitudinal and perpendicular transects are to be conducted using an accurate, continuous depth sounding methodology, such as open water echo sounding, that provides a continuous depth recording from one shore to the farthest opposing shore (Figure 1). Any alternative technology should be reviewed by DFO prior to implementing for bathymetric surveys.

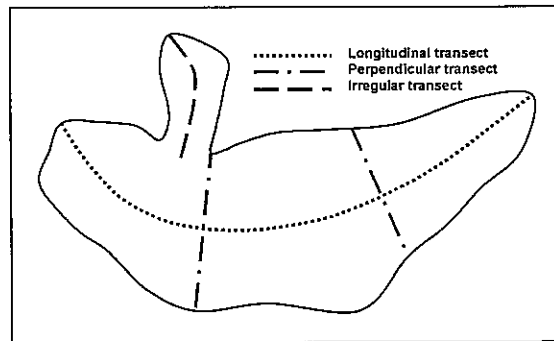
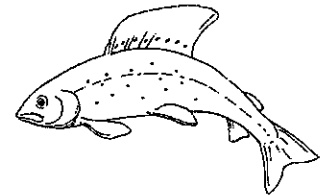


Figure 1. Minimum transect layout for a lake that is less than 1 km in length, with an irregularity.

Volume Calculations

1. Document the methods used to calculate surface area. If aerial photos or satellite imagery were used, provide the date (day/month/year) taken, as surface area may change depending on the time of year. If maps were used, provide the year that they were surveyed.
2. Detail the methods used to determine the total volume of free water, incorporating the relevant bathymetric information.
3. Calculate the available water volume under the ice using the appropriate maximum expected ice thickness, i.e. $Total\ Volume_{lake} - Ice\ Volume_{max\ thickness} = Available\ Water\ Volume$ (see Table 1 for maximum ice thickness).
4. For programs where ice-chipping is used, the total ice volume to be removed from the waterbody should be converted to total liquid volume and incorporated into the estimate of total water withdrawal requirement per water source.



DFO Protocol for Winter Water Withdrawal In the Northwest Territories

Table 1. Maximum expected ice thickness, and corresponding water depth requirements, for different regions in the Northwest Territories.

Area	Maximum Expected Ice Thickness (m)	Minimum Waterbody depth Required for 5% Water Withdrawal (m)
Above the Tree Line	2.0	≥3.5
Below the Tree Line - North of Fort Simpson	1.5	≥3.0
Deh Cho -South of Fort Simpson	1.0	≥2.5

Water Withdrawal from Watercourses:

For the purposes of this protocol, a **watercourse** is defined as a channel through which water flows and is potential fish habitat. A watercourse is defined by the ordinary high water mark of the channel, and excludes connecting waterbodies or watercourses. In order to establish a winter water withdrawal limit for a given watercourse, the following criteria must be adhered to:

1. Total water withdrawal for all activities is not to exceed 5% of the instantaneous flow rate of a single watercourse at the time of withdrawal.
2. In cases where there are multiple users withdrawing water from a single watercourse, the total combined withdrawal rate is not to exceed 5% of the instantaneous flow rate at the time of withdrawal. Therefore, consistent and coordinated water source identification is essential.

To further mitigate the impacts from water withdrawal, water intakes should be properly screened with fine mesh of **2.54 mm (1/10")** and have moderate intake velocities to prevent the entrainment of fish. Please refer to the *Freshwater Intake End-of-Pipe Fish Screen Guideline* (DFO, 1995) which is available upon request, or at the following internet address: www.dfo-mpo.gc.ca/Library/223669.pdf.

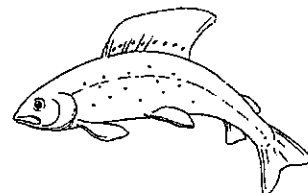
In order to determine the maximum water withdrawal rate from an ice-covered watercourse and thereby conform to this protocol, the following information must be provided to DFO for review and concurrence, prior to program commencement. DFO will only consider watercourses to be used as water sources if no suitable alternatives exist.

Water Source Identification

1. Proposed primary and secondary access routes for all project activities, with proposed water crossings and water source locations clearly identified on a map, with geographical coordinates (latitude/longitude and/or UTM) included.
2. Aerial photos or satellite imagery of the water sources if available.
3. Estimated total water withdrawal requirement for work or activity, and estimated total water withdrawal per water source (in m³).

Stream Survey Requirements

1. Location and date of survey (day, month, and year).
2. Photos of the stream location where withdrawal is to occur.
3. An accurate measurement of flow rate (to be confirmed immediately prior to water withdrawal commencing).
4. Stream survey should include; profile (minimum of ten evenly spaced points), depth, width, and flow rate.
5. Survey effort should reflect channel width: <2m wide, three vertical stations; 2-10m, 10 vertical stations; >10m, 20 vertical stations.
6. Pump specifications (type, model, horsepower, and max discharge rate).
7. Information on substrate type, in-water vegetation, riparian vegetation, and bank description is also requested.



DFO Protocol for Winter Water Withdrawal In the Northwest Territories

A brief project summary report documenting and confirming total water volume used per water source, withdrawal rates, flow rates per source and corresponding dates should be submitted to DFO within 60 days of project completion. Information should be provided in the following format (this information would also be useful as part of the project description):

Lake ID	number and/or name
Coordinates	latitude and longitude and/or UTM coordinates
Surface area	in m ²
Total Lake Volume	in m ³
Under Ice Volume	in m ³ (based on max ice thickness for region)
Max expected ice thickness value used	in m
Calculated 5% Withdrawal volume	in m ³
Total required water volume extracted	in m ³
Photograph of waterbody	
Bathymetric Map(s) of waterbody	

Any requests deviating from the above must be submitted to DFO and will be addressed on a site-specific basis.

Please note that adherence to this protocol does not release the proponent of the responsibility for obtaining any permits, licences or authorizations that may be required.

For more information contact DFO at (867) 669-4900.



**FISHERIES JOINT
MANAGEMENT COMMITTEE**

Joint Secretariat – Inuvialuit Renewable Resource Committees
Box 2120, Inuvik, NT, X0E 0T0
Tel: (867) 777-2828 Fax: (867) 777-2610 Email: fjmc@jointsec.nt.ca

June 23, 2008

Fred McFarland, Chairperson

Environmental Impact Screening Committee

Box 2120 Inuvik, NT, X0E 0T0

Dear Mr. McFarland:

Re: MGM West Langley [06 08 04]

The Fisheries Joint Management Committee bases its recommendations to the Environmental Impact Screening Committee on potentially adverse effects of “developments” on the health of fish, marine mammals, their habitats, and traditional uses.

During a teleconference on July 22th, 2008, members of the Fisheries Joint Management Committee had the opportunity to review the project proposal, **MGM West Langley [06 08 04]**. The Fisheries Joint Management Committee continues to be concerned with the use of single hulled barges for fuel storage. We recommend the use of double hulled barges for fuel storage.

In addition, the recent trend of MGM’s project submissions is to use a broad and generic brush to describe its projects. This lack of specificity makes it difficult to assess the potential effects of the activities on fish and fish habitat. This project description also relies heavily on logistical approaches contained in other project descriptions.

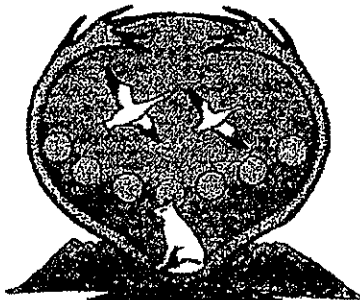
Thank you for the opportunity to review this project.

Sincerely,

Robert K. Bell

Chair, Fisheries Joint Management Committee

Tuktoyaktuk Hunters & Trappers Committee



P.O. Box 286, Tuktoyaktuk, N.W.T. X0E 1C0 • Phone (867) 977-2457 • Fax (867) 977-2433

Environmental Impact Screening Committee
P.O. Box 2120
Inuvik, NT
X0E 0T0

July 16, 2008

**Re: West Langley Drilling, Completion, Testing and Abandonment
Project 2008-2011**

The Tuktoyaktuk Hunters & Trappers Committee discussed the above project and had the following concerns:

- No usage of sumps
- Proper procedures for garbage disposal
- No down hole injection drilling

Please contact our office if you have any questions regarding this topic.

Sincerely,

Ann-Marie Villebrun
Resource Person