
Environmental
Studies
Research
Fund

Annual Report
2012

Canada

2012

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ANNUAL REPORT FOR

THE ENVIRONMENTAL STUDIES RESEARCH FUND

FEBRUARY 2013

Environmental Studies Research Fund

Profile

The Environmental Studies Research Fund (ESRF) is a research program that sponsors environmental and social studies. It is designed to assist all involved stakeholders in their decision-making related to oil and gas exploration and development on Canada's frontier lands. The ESRF program, initiated in 1983 under the *Canada Oil and Gas Act (COGA)*, now receives its legislated mandate through the superseding legislation, the *Canada Petroleum Resources Act (CPRA)*, proclaimed in February 1987. Funding for the ESRF is provided through levies on frontier lands by interest holders such as oil and gas companies. The ESRF is directed by a joint government/industry/public Management Board and is administered by a Secretariat that resides within the Office of Energy Research and Development of Natural Resources Canada in Ottawa, Ontario.

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Background on the Structure and Operation of the Fund

The Environmental Studies Research Fund (ESRF) finances environmental and social studies pertaining to the manner in which, and to the terms and conditions under which, petroleum exploration, development and production activities on frontier lands should be conducted. Subsection 101(1) of the *Canada Petroleum Resources Act* (CPRA) defines an environmental study as “*work pertaining to the measurement or statistical evaluation of the physical, chemical, and biological elements of the lands, oceans, or coastal zones, including winds, waves, tides, currents, precipitation, ice cover and movement, icebergs, pollution effects, flora and fauna, both onshore and offshore, human activity and habitation, and any related matter.*”

The Environmental Studies Research Fund is directed by a twelve-member Management Board that has representation from the federal government, the Canada–Nova Scotia Offshore Petroleum Board (CNSOPB), the Canada–Newfoundland and Labrador Offshore Petroleum Board (CNLOPB), the oil and gas industry and the general public.

The ESRF Management Board directs the business of the ESRF, sets priorities for study topics, determines the program budget and facilitates the development of study proposals on behalf of the Minister of Natural Resources Canada and the Minister of Aboriginal Affairs and Northern Development Canada.

The program operates on a calendar year basis. The Board generally meets three times a year; however, the frequency of meetings may be adjusted as circumstances dictate. The Board assesses the information requirements of government and industry to determine priorities for the study program for the coming year. The budget to support the study program and its administration forms the basis for the calculation of the levy rate schedule. The budget and levy rates are submitted to the Ministers for approval by November 1 of each year. The projects under the study program are initiated following the collection of levies that generally occurs in the first quarter of the calendar year.

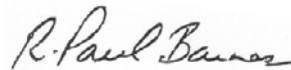
Message from the Chair

The Environmental Studies Research Fund (ESRF) was initiated in 1983. As we are beginning the ESRF program for 2013, we can celebrate the 30th year of existence of the Fund. This is a great opportunity to reflect on what was accomplished.

The Fund has sponsored and published almost 200 environmental and social studies on issues related to oil and gas exploration and production on frontier lands. Ranging from studies on habitat and wildlife, prevention of and response to hydrocarbons spills, socio-economics impacts and environmental monitoring, those studies helped to improve the understanding of Canada's frontier lands with respect to hydrocarbon-related activities. Stakeholders having an interest in frontier lands were able to use this information in order to improve their practices.

Over the 30 years of the Fund, the context of petroleum resources has changed significantly in Canada. The Fund adapted its research priorities to shifting concerns. The research now performed through the Fund in frontier lands is more relevant than ever as scientific socio-environmental information on which to base exploration, development or production activities is in increased demand.

In the years to come, it is anticipated that the pace of development activities in frontier lands will continue to increase. More questions will arise on new and different subjects. The Fund will continue adapting to the evolving context in order to inform best practices and decisions in Canada's frontier lands.



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Management Board

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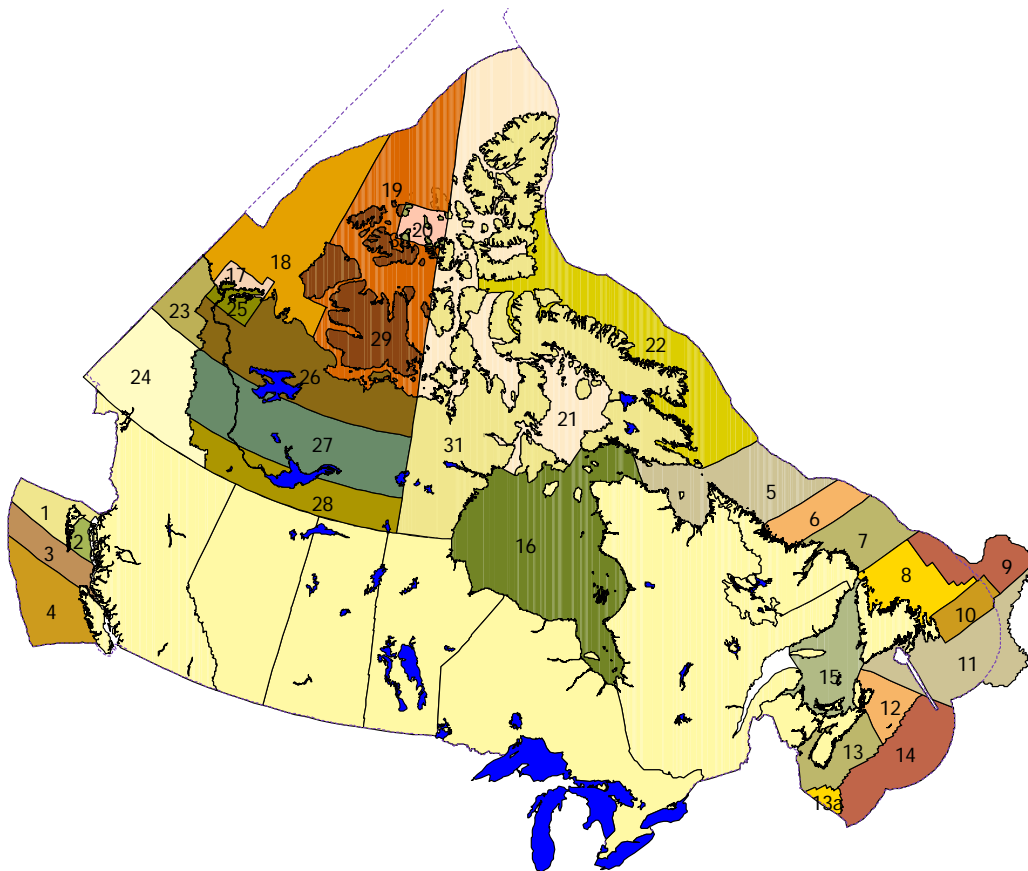
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ESRF Regions

Descriptions and maps can be viewed on the ESRF website at:

http://www.esrfunds.org/legloi_e.php



Study Program - 2012

The ESRF Management Board approved the following five new studies for the 2012 study program:

Northern Studies – 2012

Oil Spill Prevention and Management

- Uniqueness of Fishes and Habitat Utilization in Oil and Gas Lease Blocks Relative to Non-Lease Area in the Beaufort Sea
- Oil Spill Countermeasure Field Trials in Arctic Marine Waters

East Coast Studies – 2012

Hydrocarbon Spill

- Biodegradation of Natural and Chemically Dispersed Crude Oils from Atlantic Canada

Socio-Economics

- Stakeholders' Summary of an ESRF Study on the Potential Socio-Economic Effects on the Labrador Coast from Resumption of Offshore Oil and Gas Exploration and Development and Possible Future Production.

Seismic

- Investigation of Association between Past Seismic Survey Activity and Snow Crab CPUE in Offshore Newfoundland

Continuing Studies 2012 – Northern Area

Regional Effects Management

- Beaufort Sea Legacy Data Synthesis (Seabed Stability Conditions in the Shelf/Slope Transition Zone, Canadian)
- Upstream Oil and Gas Waste Stream Study, NWT

Changing Sea Ice Conditions

- Detection of Oil Under Ice with Helicopter-borne Ground Penetrating Radar (GPR)
- Improving the Accuracy of the Short-term Ice and Ocean Forecasts in the Beaufort Sea

Oil Spill Prevention and Management

- E-Space: Emergency Spatial Pre-SCAT for Arctic Coastal Ecosystems – Beaufort Sea/Mackenzie Delta
- Beaufort Sea Oil Spill Workshop (Technical Advisory Committee)

Marine Seismic

- Development of Aerial Survey Techniques and Whale Detection Methods for Seismic Operations in the Beaufort Sea
- Development of Ecologically-Based Criteria to Assess the Impact and Recovery of Seismic Lines

Continuing Studies 2012 – East Coast

Air Emissions

- Source Apportionment of Volatile Organic Compounds and Particulate Matter on Sable Island
- Modelling Air Emissions from Offshore Installations

Hydrocarbon Spills

- Effectiveness of Observers in Visually Detecting Dead Seabirds on Open Ocean
- Labrador Coast Seabird and Marine Mammal Baseline Surveys

Waste Management

- Assessment of the Potential for Impacts on Early Life Stages of Fish and Zooplankton around Petroleum Development Sites on the Grand Banks
- Biological Effects of Produced Water on Various Life Stages of Marine Fish
- Refinement and Validation of Numerical Risk Assessment Models for use in Atlantic Canada

Seismic

- Fish Behaviour in Response to Seismic Sound Workshop
- Lobster Feeding in Response to Seismic Sound
- Compilation of Cetacean Vocalizations for Passive Acoustic Monitoring (PAM) Applications

Financial Statement

The total study expenditures incurred by the ESRF in 2012 amounted to \$1,453,426 for projects initiated between 2010 and 2012 (refer to Table 1). Administrative costs amounted to \$362,628 during the current year. Revenues from the levies collected amounted to \$2,198,333 (refer to Table 2).

In accordance with the Canada Petroleum Resource Act, when an interest is issued during the course of the year, levies for that year and the two years prior are collected by the Fund. The collection of unpaid levies is pursued on an ongoing basis by the ESRF Secretariat.

Table 1 - ESRF Operating Budget as of December 31, 2012 (in dollars)

Regions	Opening Cash Balance (January 1, 2012)	Total Levies Collected	Administrative Costs	Study Program Expenditures	Closing Cash Balance (December 31, 2012)
SOUTH: Regions 1 to 16	3,084,108	1,220,790	(181,314)	(303,917)	3,819,667
NORTH: Regions 17 to 31	2,231,958	977,543	(181,314)	(1,149,509)	1,878,678
TOTAL	\$5,316,066	\$2,198,333	(\$362,628)	(\$1,453,426)	\$5,698,345

Table 2 - ESRF Revenues

January 01, 2012 to December 31, 2012 (in dollars)

REGIONS	Levy #24 (\$/ha)	Levies Invoiced – Levy #24	Levies Collected	Previous Levies Collected during the current year	Total Levy Revenue Collected
		B	C	D	(C+D)
1 Queen Charlottes North	0	0	0	0	0
2 Hecate Strait	0	0	0	0	0
3 Queen Charlottes South	0	0	0	0	0
4 Vancouver Island	0	0	0	0	0
5 Labrador North	0	0	0	0	0
6 Labrador Central	0.0912	87,083	87,083	99,664	186,747
7 Labrador South	0.0912	515	515	81,720	82,235
8 Northeast Newfoundland	0	0	0	0	0
9 Newfoundland Slope	0.1742	261,436	261,436	63,980	325,416
10 Grand Banks North	0.2059	246,882	246,882	0	246,882
11 Grand Banks South	0.1742	50,530	50,530	199,276	249,806
12 Scotian Shelf East	0	0	0	0	0
13 Scotian Shelf West	0	0	0	0	0
14 Scotian Slope	0	0	0	87,545	87,545
15 Gulf of St. Lawrence	0	0	0	42,159	42,159
16 Hudson Bay	0	0	0	0	0
17 Beaufort South	0	0	0	36,693	36,693
18 Beaufort North	0.7639	920,016	920,016	0	920,016
19 Western Archipelago-Offshore	0	0	0	0	0
20 Central Archipelago-Offshore	0	0	0	0	0
21 Eastern Archipelago-Offshore	0	0	0	0	0
22 Baffin Bay	0	0	0	0	0
23 Yukon North	0	0	0	0	0
24 Yukon South	0	0	0	0	0
25 Mackenzie Delta	0	0	0	0	0
26 Mackenzie North	0	0	0	19,067	19,067
27 Mackenzie Central	0	0	0	0	0
28 Mackenzie South	0	0	0	1,767	1,767
29 Western Archipelago-Onshore	0	0	0	0	0
30 Central Archipelago-Onshore	0	0	0	0	0
31 Eastern Archipelago-Onshore	0	0	0	0	0
TOTAL		1,566,462	1,566,462	631,871	2,198,333

Amendment to the financial statement of 2011

Errors in the 2011 financial statement have been recognized retroactively and corrections are provided below. The most significant of the errors was an omission of expenses. The expenses were incurred near the end of the government fiscal year 2010-2011, but were not processed in the financial system until the start of the fiscal year 2011-2012. A new financial system was launched at NRCan at the start of fiscal year 2011-2012. Based on accounting principles, these expenses had to be recognized in the fiscal year 2010-2011, and therefore they were entered in the retired financial system. This period was an oversight at the time of the ESRF calendar year 2011 reporting. Other errors are also identified and corrected in this report.

Table 3 - ESRF Operating Budget as of December 31, 2011 (in dollars)

Regions	Opening Cash Balance (January 1, 2011)	Total Levies Collected	Administrative Costs	Study Program Expenditures	Closing Cash Balance (December 31, 2011)
SOUTH: Regions 1 to 16					
Published (2011)	3,627,943	22,513	(186,028)	(198,565)	3,265,863
Corrections (see notes)				(181,988) ^a	233 ^b
Revised 2011	3,627,943	22,513	(186,028)	(380,553)	3,084,108
NORTH: Regions 17 to 31					
Published (2011)	2,206,123	893,347	(186,028)	(683,152)	2,230,290
Corrections (see notes)	(38) ^c	1,706 ^d			
Revised 2011	2,206,085	895,053	(186,028)	(683,152)	2,231,958
REVISED TOTAL	\$5,834,028	\$917,566	(\$372,056)	(\$1,063,705)	\$5,316,066

a - Correction for error of omission of expense amount from the ESRF Annual Report 2011

b - Correction of carry forward from March 31st in fiscal year 2010-2011 to April 1st in fiscal year 2011-2012

c - Correction of discrepancy between actual and recorded amount in 2004-2005.

d - Correction for error of omission of levy amount from the ESRF Annual Report 2011

Plans for 2013

In September 2012, the ESRF Management Board established the budget for the 2013 program which will be supported by Levy #25. The associated levies were recommended by the Management Board and have been submitted for approval to the Minister of Natural Resources Canada and the Minister of Aboriginal Affairs and Northern Development Canada. The total 2013 program budget is \$3,705,000, continuing studies from 2012 will be funded from the balance of existing funds.

The ESRF Management Board has established the following research priority areas for 2013:

North

- Oil Spill Preparedness, Fate & Effect
- Regional Effects Management

East Coast

- Hydrocarbon Spills
- Seismic

Publication of Reports

All ESRF studies are subject to a scientific/technical peer review. Reports that are deemed to be scientifically or technically significant are published in the ESRF Technical Report Series. Since its inception in 1983 until December 31, 2012, the ESRF has published 190 reports and 3 related studies. All reports and studies are available to download for free on the [ESRF website](#).

Publications are listed under the following categories:

- Bibliographies
- Environmental Effects and Monitoring
- Environmental Loading and Design
- Frontier Social and Economic Issues
- Ice-Icebergs-Ice Detection
- Oil Spill Research and Countermeasures
- Sea Bottom Ice Scour
- Sediment Transport
- Waves

Recent Publications - 2012

- 189 Sikimuit Environmental Management Ltd. *An Assessment of Predicted Socio-Economic Impacts of Labrador Shelf and Gas Activity on Labrador Communities and Individuals*. December 2011. 156 p.
- 190 CEF Consultants Ltd. Report of a Workshop on *Fish Behavior in Response to Seismic Sound*. November 2011. 109 p.

Appendix – ESRF Publications 1985 – 2012

Bibliographies

- 010 Goodwin, C.R., J.C. Finley and L.M. Howard. *Ice Scour Bibliography*. July 1985. 99 p.
- 026 Young, S.C. *Bibliography on the Fate and Effects of Arctic Marine Oil Pollution*. March 1986. 212 p.
- 030 Howard, L.H. *Icebergs: A Bibliography Relevant to Eastern Canadian Waters*. May 1986. 277 p.
- 050 Finley, J.C. and C.R. Goodwin. *The Training and Employment of Northern Canadians: An Annotated Bibliography*. November 1986. 206 p.
- 130 Hunter, S.P. and J.H. Vandermeulen. *Bibliography of Aquatic Oil Pollution Fate and Effects*. December 1994. CD-Rom.
- 136 Coastal Resource Inventory: Great Northern Peninsula. Not published.

Environmental Effects and Monitoring

- 001 McLaren, P.L. and R.A. Davis. *Distribution of Bowhead Whales in the Beaufort Sea*. Summer 1983. February 1985. 62 p.
- 005 Thomas, D.J., W.S. Duval, C.S. Johnston, G.S. Lewbel, A. Birdsall, M.S. Hutcheson, G.D. Greene, R.A. Buchanan and J.W. MacDonald. *Effects Monitoring Strategies and Program for Canada's East Coast*. May 1985. 88 p.
- 009 Harwood, L.A. and A. Borstad. *Bowhead Whale Monitoring Study in the Southeast Beaufort Sea*. July-September 1984. August 1985. 99 p.
- 021 Tidmarsh, W.G., R. Ernst, R. Ackman and T. Farquharson. *Tainting of Fishery Resources*. January 1986. 174 p.
- 025 Kingsley, M.C.S. *Distribution and Abundance of Seals in the Beaufort Sea, Amundsen Gulf & Prince Albert Sound*. 1984. February 1986. 16 p.
- 028 Thomson, D.H., D.B. Fissel, J.R. Marko, R.A. Davis and G.A. Borstad. *Distribution of Bowhead Whales in Relation to Hydrometeorological Events in the Beaufort Sea*. March 1986. 119 p.
- 036 Norton, P. and L.A. Harwood. *Distribution, Abundance and Behavior of White Whales in the Mackenzie Estuary*. June 1986. 73 p.
- 057 Duval, W.S. (ed.). *Distribution, Abundance and Age Segregation of Bowhead Whales Relative to Industry Activities and Oceanographic Features in the Beaufort Sea, August-September 1985*. March 1987. 117 p.

- 060 Yunker, M.B. and R.W. Drinnan. *Dispersion and Fate of Oil from Oil-based Drilling Muds near Sable Island, N.S.* January 1987. 169 p.
- 063 Drinnan, R.W., M. Yunker, A. Gillam, N. Charchuk and S.R.H. Davis. *Options for Treatment and Disposal of Oil-based Mud Cuttings in the Canadian Arctic.* February 1987. 167 p.
- 066 Nenninger, R.D. *Monitoring a Sump Containing Drilling Mud with High Salt Content.* March 1987. 47 p.
- 075 Cross, W.E. and B. Humphrey. *Monitoring the Long-Term Fate and Effects of Spilled Oil in an Arctic Marine Subtidal Environment.* August 1987. 120 p.
- 080 Ernst, R.J., W.M.N. Ratnayake, T.E. Farquharson, R.G. Ackman and W.G. Tidmarsh. *Tainting of Finfish by Petroleum Hydrocarbons.* September 1987. 150 p.
- 089 Ford, J.K.B., J.C. Cabbage and P. Norton. *Distribution, Abundance, and Age Segregation of Bowhead Whales in the Southeast Beaufort Sea, August-September, 1986.* November 1987. 53 p.
- 090 Wainwright, P.F. and B. Humphrey. *Analysis of Sediment Data from the Beaufort Shorebase Monitoring Program, 1982-1984.* March 1988. 78 p.
- 093 Hardy BBT Limited and Stanley Associates Engineering Ltd. *Handling and Disposal of Waste Drilling Fluids from On-Land Sumps in the Northwest Territories and Yukon.* February 1988. 58 p.
- 101 Erickson, P., B. Fowler, and D. Thomas. *Oil-based Drilling Muds: Off Structure Monitoring-Beaufort Sea.* June 1988. 188 p.
- 102 Nakashima, D.J. and D.J. Murray. *The Common Eider of Eastern Hudson Bay: A Survey of Nest Colonies and Inuit Ecological Knowledge.* November 1988. 174 p.
- 109 Lawrence, M.J. and S.L. Davies (eds.). *Wildlife and Wildlife Habitat Restoration and Compensation in the Event of an Oil Spill in the Beaufort Sea.* March 1993. 88 p.
- 110 Hurlbut, S.E., D.P. French and B.J. Taylor. *Evaluation of the Potential Effects of Major Oil Spills on Grand Banks Commercial Fish Species as a Result of Impacts on Eggs and Larvae.* January 1991. 53 p.
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- 118 Thomas, D.J. *Considerations in the Design of Effects Monitoring Strategies: Beaufort Sea Case Study.* January 1992. 54 p.
- 121 S.L. Ross Environmental Research Limited and Ledrew, Fudge and Associates. *The Risk of Tainting Flatfish Stocks During Offshore Oil Spills.* January 1993. 67 p.
- 122 Mackinnon, D.S. and P.A. Lane. *Saltmarsh Revisited – The Long-Term Effects of Oil and Dispersant on Saltmarsh Vegetation.* September 1993. 24 p.

- 123 Duval, W.S. *Proceedings of a Workshop on the Beaufort Sea Beluga February 3–6, 1992, Vancouver, B.C.* March 1993. 26 p.
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- 138 Montevecchi, W.A., F.K. Wiese, G. Davoren, A.W. Diamond, F. Huettmann and J. Linke. *Seabird Attraction to Offshore Platforms and Seabird Monitoring from Offshore Support Vessels and other Ships Literature Review and Monitoring Design.* 1999. 56 p.
- 139 Thomson, D. H., J. W. Lawson and A. Muecke. *Proceedings of a Workshop to Develop Methodologies for Conducting Research on the Effects of Seismic Exploration on the Canadian East Coast Fishery, Halifax, Nova Scotia, September 7–8 2000.* April 2001. 92 p.
- 142 ERIN Consulting Ltd. and OCL Services Ltd. *Sheens Associated with Produced Water Effluents – Review of Causes and Mitigation Options.* March 2003. 46 p.
- 143 Mortensen, Pål B., Lene Buhl-Mortensen, Susan E. Gass, Donald C. Gordon Jr., Ellen L.R. Kenchington, Cynthia Bourbonnais and Kevin G. MacIsaac. *Deep-Water Corals in Atlantic Canada: A Summary Of ESRF-Funded Research (2001–2003).* December 2004. 43 p.
- 144 Christian, J. R., A. M. Mathieu, D. H. Thomson, D. White and R. A. Buchanan. *Effect of Seismic Energy on Snow Crab (Chionoecetes opilio).* November 2003. 106 p.
- 145 Racca, R. G., D. E. Hannay, R. B. Murray, W. B. Griffiths, and M. Muller. *Testing Fish Deterrents for Use Under-Ice in the Mackenzie Delta Area.* March 2004. 118 p.
- 146 Buchanan, R. A., J. A. Cook and A. M. Mathieu. *Environmental Effects Monitoring for Exploration Drilling.* December 2003. 86 p.
- 147 Dillon Consulting Limited with DMT Cordah. *Pollution Prevention Opportunities in the Offshore Oil and Gas Sector – Final Report.* October 2003. 73 p.
- 148 Dillon Consulting, BMT Cordah Ltd. *Standardizing the Reporting of Air Emissions to Ambient Air from Atlantic Canada Offshore Petroleum Activities.* March 2003. 52 p.
- 149 Trudel, K. *Workshop on Dispersant Use in Eastern Canada.* 2004. 109 p.
- 150 Martec Limited, CEF Consultants Ltd, DRDC Atlantic, St. Francis Xavier University. *Effects of Pipelines/Gathering Lines on Snow Crab and Lobster.* December 2004. 61 p.
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- 152 Ellis & Associates. *Drilling Waste Management – Recommended Best Practices.* January 2005. CD-Rom.

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- 175 AECOM. *Considerations in Developing Oil and Gas Industry Best Practices in the North*. April 2009. 36 p.
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