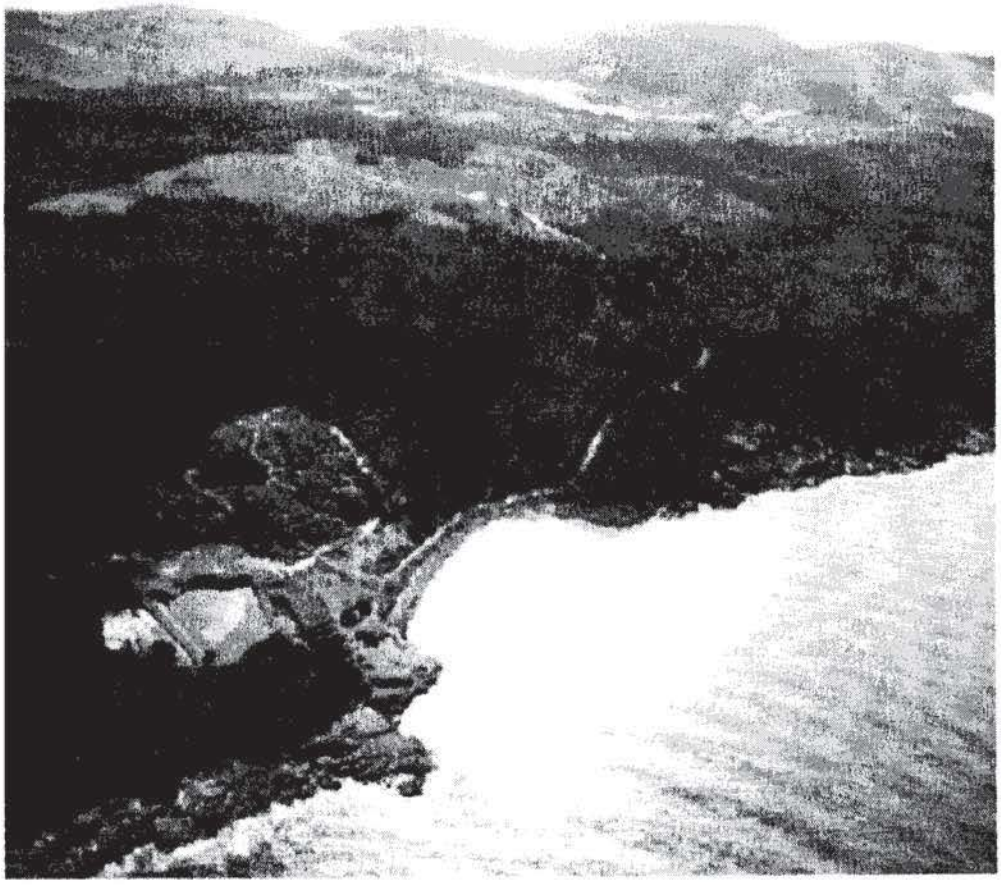
VOLUME III
APPENDICES

WHITES POINT QUARRY & MARINE TERMINAL

ENVIRONMENTAL IMPACT STATEMENT



BILCON

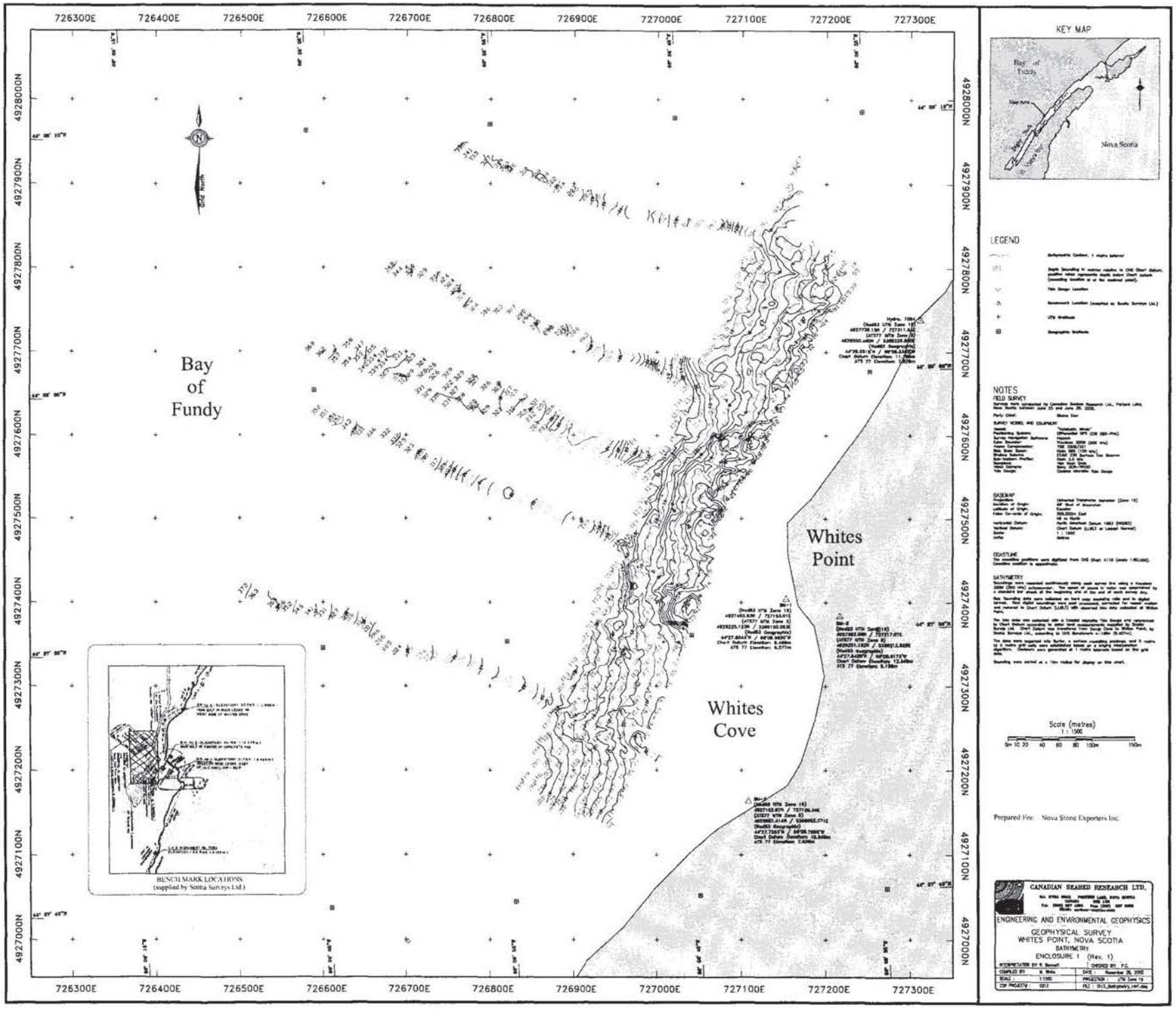
March 31, 2006

APPENDIX VOLUME III

Table of Contents

APPENDIX VOLUME III

Table of Contents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4927800N
4927700N
4927600N
4927500N
4927400N
4927300N
4927200N
4927100N
4927000N
Grid North
Bay of Fundy
Whites Point
Whites Cove
BENCH MARK LOCATIONS
(supplied by Scotia Surveys Ltd.)
KEY MAP
Bay of Fundy
Nova Scotia
LEGEND
NOTES
FIELD SURVEY
BASEMAP
COASTLINE
BATHYMETRY
Scale (metres)
1 : 1500
Prepared For: Nova Stone Exporters Inc.
CANADIAN SEABED RESEARCH LTD.
ENGINEERING AND ENVIRONMENTAL GEOPHYSICS
GEOPHYSICAL SURVEY
WHITES POINT, NOVA SCOTIA
BATHYMETRY
ENCLOSURE 1 (Rev. 1)

APPENDIX 3

ATTITUDE SURVEY
Source: AMEC

APPENDIX 4

BASALT BEDROCK CHEMICAL ANALYSIS
Source: PSC Analytical Services

APPENDIX 5

BERRY SAMPLE ANALYSIS
Source: Maxxam Analytics Inc.

APPENDIX 6

BILCON OF NOVA SCOTIA

COMMUNICATIONS ACTIVITIES
Source: AMEC

APPENDIX 7

BILCON OF NOVA SCOTIA

NEWSLETTERS
1-6

APPENDIX 8

BIRD SPECIES OF BRIER ISLAND
Source: Lance Laviolette

APPENDIX 9

BLASTING PLAN
by
BILCON OF NOVA SCOTIA

APPENDIX 10

CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY

NEWS RELEASES

APPENDIX 11

CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY

REGISTRY SUBMISSIONS
Source: AMEC

APPENDIX 12

CLAYTON's COMMUNITY EXAMPLES

APPENDIX 13

CLAYTON'S RECLAMATION

"RESTORING DISTURBED SITES IN THE PINELANDS"
Source: New Jersey Outdoors
Summer 1999

APPENDIX 14

CLIMATE - PRECIPITATION & TEMPERATURE
WEYMOUTH FALLS
DIGBY PRIM POINT
METEGHAN RIVER

Source: Meteorological Service of Canada

APPENDIX 15

CONFEDERACY OF MAINLAND MI'MAQ

LETTERS re STUDY PROPOSAL

December 14, 2004 and January 10, 2005

APPENDIX 16

CONFEDERACY OF MAINLAND MI'MAQ

REPORT *"Mi'kmaq Use of Oositookum (Digby Neck), It's Surrounding Waters, and the Mainland Shore of St. Mary's Bay"*

December 2005

APPENDIX 17

FISH HABITAT COMPENSATION PLAN PROPOSAL

September 2005

APPENDIX 18

FISHERIES AND OCEANS CANADA LETTER
re
WATERCOURSE

September 18, 2002

APPENDIX 19

FISHERIES AND OCEANS CANADA LETTER
re
WHITES POINT PROJECT PROPOSAL

June 26, 2003

APPENDIX 20

FISHERIES AND OCEANS CANADA LETTER
re
BLASTING ACTIVITY

November 12, 2004

APPENDIX 21

FISHERIES AND OCEANS CANADA LETTER
re
PROPOSED HABITAT COMPENSATION PLAN

November 24, 2005

APPENDIX 22

FISHERIES AND OCEANS CANADA LETTER
re
REVIEW OF WHITES POINT
PROPOSED BLASTING PROTOCOL

February 10, 2006

APPENDIX 23

GEOPHYSICAL SURVEY

Source: R. Bennett
Canadian Seabed Research Ltd.

APPENDIX 24

Joint Review Panel Agreement
and
Terms of Reference

Attitude Survey Results: A survey was undertaken as part of the environmental assessment process of the Whites Point project. This attitude survey was used to identify the main concerns of residents regarding the project and also to determine the premise for their attitudes – in other words – why they hold certain opinions about the project.

	Survey Question	Responses	Frequency (%)			
Sample Size: **457** Reliability: **± 5.0% at 95% confidence** level			**Males**	**Females**	**Total**	**834 Exchange[1] Sample: 94**
1.	Have you heard of the White's Point Quarry project? (Sample: 476)	a) Yes b) No	96.1 3.9	96.0 4.0	96.0 4.0	100 0.0
2.	From which of the following sources have you received MOST of your information about the White's Point project? (Sample:457)	a) Local newspaper b) Word of mouth c) Radio d) Environmental Group e) Community group f) Bill boards/protest signs g) Newsletters / flyers h) Media i) TV j) MHA / Gov't member k) Other l) Don't Know / No Answer / No Answer	53.3 55.5 21.7 12.5 12.4 4.3 0.7 0.4 0.7 0.7 1.6 0.4	57.3 55.3 19.0 14.5 16.5 3.7 1.2 0.6 0.3 0.0 0.8 0.8	55.4 55.4 20.3 13.5 14.5 4.0 1.0 0.5 0.5 0.4 1.2 0.6	61.7 61.6 26.7 19.4 31.7 0.0 2.2 0.0 0.0 1.2 0.0 0.0
3a.	What kind of project is it? (Sample: 457)	a) Basalt / Rock Quarry b) Quarry limestone for US Roads c) Quarry Rock to be shipped away / shipped to US d) Mining Project e) Other f) Don't Know / No Answer	67.0 12.3 8.3 4.7 3.2 9.8	56.1 5.9 5.9 4.9 6.9 23.9	61.3 9.0 7.0 4.8 5.2 17.1	84.3 7.7 5.2 6.0 8.7 2.5

[1] The "834" exchange includes the communities of Centreville, Freeport, Sandy Cove, Little River, Tiverton and Westport.

3b.	Where will it be located? (Sample: 457)	a) Digby Neck b) Little River c) White's Cove d) White's Point on Digby Neck e) Sandy Cove f) Whale Cove g) Digby County h) Other i) Don't Know / No Answer	48.5 19.0 6.5 3.9 4.5 1.1 0.8 4.3 11.8	53.9 16.6 5.7 2.2 1.3 1.5 1.5 5.7 12.0	51.3 17.8 6.1 3.0 2.8 1.3 1.1 5.0 11.9	16.9 27.2 26.4 15.7 0.0 0.0 0.0 8.7 6.8
3d.	How long will the project last? (Sample: 456)	a) Forever/ very long time b) Until the resources run out c) 1-3 years d) 4-5 years e) 6-10 years f) 11-20 years g) 21-50 years h) 51-100 years i) Other j) Don't Know / No Answer	6.8 2.7 0.9 2.7 1.8 5.0 6.8 0.9 0.9 71.2	7.6 3.0 2.1 2.5 2.1 1.7 3.8 0.0 0.0 77.2	7.2 2.9 1.5 2.6 2.0 3.3 5.3 0.4 0.4 74.3	11.1 8.3 0.0 0.0 0.0 16.7 11.1 0.0 0.0 52.8
3e.	What will happen to the quarry mined? (Sample: 456)	a) Sent to New Jersey b) Shipped away c) Shipped to US d) Shipped to US for road construction e) For roads / waste land f) Other g) Don't Know / No Answer	1.8 6.8 32.9 5.9 6.4 9.6 36.5	1.7 6.3 23.2 8.9 1.2 8.4 50.2	1.8 6.6 27.9 7.5 3.7 9.0 43.6	0.0 10.8 37.8 16.2 8.1 5.4 21.6
4.	Do you know if Digby County will receive any financial or other benefits from the project? (Sample: 457)	a) Yes: • Jobs • Tax revenue • Good for economy • Other b) No c) Don't Know / No Answer	 19.6 8.2 1.8 4.6 28.3 37.4	 12.2 4.6 2.9 3.4 26.5 50.4	 15.8 6.3 2.4 3.9 27.4 44.2	 20.6 0.0 2.9 2.9 50.0 23.5
5.	Have you heard any opinions expressed about the project? (Sample: 457)	a) Yes (Sample : 393) • Some people are for it and some people	84.1	87.4	86.0	83.3

		are against it	29.7	34.5	32.3	17.0
		• Environment/ecosystem	26.6	30.9	28.9	18.0
		• Impact on fishery	24.5	26.2	22.3	44.1
		• Noise, dust	20.5	11.5	15.7	16.5
		• It will create jobs	11.8	9.0	10.4	9.1
		• Impact on whales	12.1	7.1	9.5	
		• Impact on lobster fishery	12.9	8.5	9.5	22.0
		• Disturb the natural landscape / beauty of area	6.3	10.2	8.4	5.1
		• Water/air pollution	6.9	4.6	5.7	4.8
		• Impact on tourism	6.1	6.1	6.1	7.3
		• The project generally is not good for the area	1.2	5.1	3.2	2.1
		• Impact on water quality	4.4	2.4	3.3	12.4
		• Increased marine traffic	6.1	3.6	4.8	5.2
		• Ballast water	4.5	1.7	3.0	9.5
		• Deterioration of roads	1.6	2.2	1.9	0.0
		• Drop in the water table	3.2	0.9	2.0	0.0
		• Losing our resources	1.6	3.6	2.7	3.0
		• Other	18.5	14.9	16.6	24.8
		• Don't Know / No Answer	0.0	1.6	0.9	7.6
		b) No	14.2	10.1	12.0	16.7
		c) Don't Know / No Answer	1.4	2.5	2.0	0.0
6.	Overall, do YOU think the White's Point is a good project for Digby County? (Sample: 457)	a) Yes → Why? (Sample: 132)	37.4	21.0	28.9	25.0
		• Job creation	80.3	71.2	76.9	65.6
		• Good for economy	16.0	14.7	15.5	24.4
		• Higher paying jobs	0.0	3.6	1.4	15.5
		• Other	19.1	16.5	18.3	25.5
		• Don't Know / No Answer	0.0	4.5	1.7	0.0
		b) No → Why Not? (Sample: 184)	38.4	4.20	40.3	58.3
		• Environment/ecosystem	28.3	31.5	30.0	11.8
		• Destroying the fishery	24.1	20.8	22.3	39.3
		• Destroying the area	15.4	15.1	15.3	14.0

		• No benefits	13.0	4.8	8.5	6.5
		• Air/water pollution	7.8	6.9	7.3	10.3
		• Destroying the whale habitat	6.9	2.0	4.2	7.6
		• Noise Levels	1.7	6.1	4.1	12.0
		• Losing our resources	1.8	3.5	2.7	6.4
		• Destroying marine life	1.7	1.5	1.6	7.8
		• Other	48.2	41.7	44.6	49.0
		• Don't Know /No Answer	2.6	1.5	2.0	0.0
		c) Don't Know / No Answer	24.2	37.0	30.9	16.7
7.	Do YOU believe the jobs created by the project will be important to Digby County? (Sample: 457)	a) Yes → Why? (Sample: 250)	62.1	47.9	54.7	33.3
		• Jobs are important to the area	57.8	52.1	55.2	63.8
		• Hiring of local people	14.9	22.6	18.4	13.8
		• Improve the economy	9.2	9.3	9.3	0.0
		• Take people off welfare	0.6	1.5	1.0	0.0
		• Other	15.7	14.3	15.1	10.6
		• Don't Know / No Answer	4.1	10.0	7.0	11.8
		b) No → Why Not? (Sample: 137)	28.8	31.1	30.0	50.0
		• Hiring of outsiders	29.4	37.5	33.8	54.5
		• Not sustainable	12.5	14.4	13.5	9.8
		• Not that many jobs available	12.5	13.3	12.9	20.6
		• Not enough jobs to have an impact	14.5	10.5	12.3	6.9
		• Unskilled people in the area	7.6	3.1	5.2	0.0
		• Only low paying jobs	3.6	5.0	4.4	4.3
		• Other	28.4	33.2	31.0	16.4
		• Don't Know / No Answer	4.6	6.5	5.6	8.8
		c) Don't Know / No Answer	9.1	21.0	15.3	16.7
8.	In YOUR opinion will the White's Point project affect the natural environment of Digby County? (Sample: 457)	a) Yes → How? (Sample: 306)	61.2	71.8	66.7	69.4
		• Destroying the landscape/loss of tree line	41.2	45.2	43.4	26.6
		• Air / water pollution	13.5	19.9	17.1	20.2
		• Killing fish / destroying habitat				

		• Silt in the bay / run-offs / chemicals in ocean	13.7	15.6	14.8	26.0
			13.4	4.3	8.3	17.5
		• Endanger wildlife	9.4	11.0	10.3	19.1
		• Change in the water tables	11.8	4.5	7.7	5.6
		• Decline in whale population	10.4	5.7	7.7	7.3
		• Disturbing the natural sea life	9.5	6.4	7.8	12.2
		• Too many boats in water	6.2	7.6	7.0	14.5
		• Detrimental to lobster fishery	4.2	5.8	5.1	20.0
		• Health problems	3.4	0.7	1.9	0.0
		• Plant life will die	2.8	1.1	1.9	6.4
		• Other	16.5	19.9	18.4	12.5
		• Don't Know / No Answer	2.4	6.4	4.6	0.0
		b) No	20.1	10.5	15.1	27.8
		c) Don't Know / No Answer	18.7	17.6	18.2	2.8
9.	In YOUR opinion will the project affect the overall well-being and quality of people's lives in Digby County? (Sample: 457)	a) Yes → How? (Sample:232)	50.2	51.3	50.8	56.8
		<u>Positive:</u>				
		• More / better jobs	23.0	18.2	20.5	9.0
		• Increases in the economy	11.1	6.0	8.4	2.1
		• More homes will be built	0.7	0.5	0.6	
		<u>Negative:</u>				
		• Destroy livelihood of people in fishery and tourism	18.6	14.0	16.2	27.2
		• Too much noise	12.5	15.8	14.2	11.6
		• Air / water pollution	14.4	7.9	11.0	16.6
		• Silt run off/more pollution	7.7	12.5	10.2	8.6
		• Too much traffic on land and water	4.2	4.0	4.1	9.9
		• Bad impact on tourism	3.4	3.3	3.3	6.6
		• Destroying habitats	4.2	2.7	3.4	0.0
		• Roads will be destroyed	1.4	3.7	2.6	4.3
		• Trouble with water tables	3.7	0.7	2.1	0.0
		• Negative impact on eco-system	0	1.7	0.9	0.0
		• Quality of water	0.8	0.7	0.7	0.0
		• Other	37.9	39.8	38.6	39.3
		• Don't Know / No Answer	4.4	4.2	4.3	0.0

		b) No c) Don't Know / No Answer	30.6 19.2	21.4 27.3	25.8 23.4	29.7 13.5
10.	In YOUR opinion will the project affect tourism opportunities in Digby County? (Sample: 457)	a) Yes → Why? (Sample: 173) <u>Positive:</u> • It will bring more tourists to the area <u>Negative:</u> • Will drive tourists away • Will spoil beauty of the landscape • Will drive away the whales • Too much noise • Will be an ugly site • Will kill the fishery / deep sea fishery • No scenic view • Bad for campgrounds • Other • Don't Know / No Answer b) No c) Don't Know / No Answer	32.4 6.6 50.4 25.4 22.9 10.3 9.7 4.9 3.3 0.0 17.9 2.2 53.9 13.7	42.9 5.3 48.2 23.1 17.2 6.7 5.4 3.1 1.5 0.6 23.2 4.5 33.6 23.5	37.9 5.8 49.1 24.0 19.6 8.1 7.2 3.9 2.2 0.3 21.0 3.5 43.3 18.8	48.6 6.6 49.4 24.8 21.9 0.0 13.3 2.5 4.5 0.0 21.9 0.0 45.9 5.4
11.	In YOUR opinion will the project affect local traditional activities? (Sample: 455)	a) Yes → Why? (Sample 159) • Will destroy fishing and spawning grounds • Will have a bad affect on people • Will destroy the characteristics of quiet fishing villages • Bad impact on tourism • Will hurt activities like hunting, camping, picnicking, walking trial, skidooing • Will affect plant life • Will take away from the scenic beauty • Will destroy farmlands • Will change the culture • Bird watching	35.8 61.6 14.4 7.1 9.3 6.1 2.7 1.9 1.0 0.0 0.0	34.22 53.2 12.0 8.8 3.2 5.8 1.8 0.0 0.7 1.0 0.9	34.9 57.3 13.2 8.0 6.2 5.9 2.2 1.0 0.8 0.5 0.5	38.9 70.8 20.8 0.0 9.0 0.0 5.7 0.0 0.0 0.0 0.0 0.0

		• Other	17.7	19.8	18.8	0.0
		• Don't Know / No Answer	3.5	11.1	7.3	8.8
		b) No	47.2	35.9	41.3	55.6
		c) Don't Know / No Answer	17.0	30.0	23.7	5.6
12.	In YOUR opinion will the coastline near the project be affected by the project? (Sample: 457)	a) Yes → Why? (Sample: 294)	61.2	67.2	64.3	75.7
		• Large hole will be left in side of coastline	15.2	18.9	17.2	24.8
		• Building a wharf / huge wharf / eye-sore terminal	17.6	9.5	13.2	15.0
		• Pollution of water	13.6	5.3	9.1	4.6
		• Marine traffic	9.8	7.2	8.4	1.6
		• Environmental issues	10.3	5.3	7.6	8.2
		• Visually it will not be good	5.3	7.8	6.6	8.5
		• Erosion	4.2	8.2	6.4	2.9
		• Spills along the coastline	6.5	1.7	3.9	3.4
		• Will affect the mountain range	4.1	5.0	4.6	14.9
		• Water levels	1.2	1.1	1.2	0.0
		• Other	27.0	42.7	35.5	36.7
		• Don't Know / No Answer	3.1	7.3	5.4	2.9
		b) No	20.5	9.7	14.9	21.6
		c) Don't Know / No Answer	18.3	23.1	20.8	2.7
13.	In YOUR opinion will the project have an affect on the local lobster fishery? (Sample: 456)	a) Yes → Why? (Sample: 215)	49.3	45.1	47.1	72.2
		• Silt run-off and/or ballast water will destroy habitats	14.8	21.1	18.0	33.3
		• Ships will destroy lobster pots	13.0	10.0	11.5	25.9
		• Blasting, construction and dredging will cause environmental damage	7.4	11.0	9.2	7.4
		• High volume of shipping traffic	10.2	4.6	7.4	14.8
		• Upset balance of marine life	5.6	6.4	6.0	3.7
		• Spawning grounds in the cove will be disturbed	4.6	8.3	6.5	0.0
		• Fish will move to deeper waters	2.8	7.3	5.1	3.7
		• Floor of ocean will change	1.9	1.8	1.8	0.0

		• Land and water temperature will affect water temperature	0.0	0.9	0.5	0.0
		• Other	33.3	20.2	26.7	11.1
		b) No	24.2	19.0	21.5	19.4
		c) Don't Know / No Answer	26.5	35.9	31.4	8.3
14.	In YOUR opinion will the project affect Digby County's economy? (Sample: 457)	a) Yes → Why? (Sample: 301)	68.9	63.0	65.9	59.5
		<u>Positive:</u>				
		• Will create growth in the economy	42.7	32.9	37.7	40.9
		• There will be more jobs in the area	27.3	25.0	26.2	4.5
		• There will be more spending in the area	8.0	9.2	8.6	4.5
		<u>Negative:</u>				
		• It will destroy people's livelihoods	11.3	11.8	11.6	40.9
		• Less tourists	1.3	2.6	2.0	4.5
		• Other	6.0	12.5	9.3	4.5
		• Don't Know / No Answer	3.3	5.9	4.6	0.0
		b) No	23.7	13.9	18.6	29.7
		c) Don't Know / No Answer	7.3	23.1	15.5	10.8
15.	Of the issues raised respecting the project, which concerns you the most? (Sample: 457)	a) Environmental issues	11.0	18.3	14.8	8.8
		b) Fishery	12.3	11.7	12.0	20.6
		c) Landscape	4.6	10.4	7.6	11.7
		d) Economic Impacts	6.8	5.4	6.1	8.8
		e) Lobster Fishery	5.0	5.0	5.0	11.8
		f) Water Quality	3.7	3.8	3.7	0.0
		g) Whales	1.8	2.1	2.0	0.0
		h) Noise / dust	2.7	4.2	3.5	0.0
		i) Ecological impact	1.8	1.7	1.7	0.0
		j) Ballast Water	1.8	0.8	1.3	0.0
		k) Resources being taken away	1.8	0.8	1.3	5.9
		l) Affect people's lifestyle	0.5	2.5	1.5	0.0
		m) Marine traffic	1.4	0.8	1.1	0.0
		n) The results once the developer is gone	1.8	0.4	1.1	0.0
		o) Lack of information	1.4	0.4	0.9	0.0
		p) Infrastructure / traffic	1.4	0.4	0.9	0.0

		q) All the issues	1.4	0.4	0.9	0.0
		r) Oil and chemical spills	1.4	0.0	0.7	9.5
		s) Tourism	0.9	0.0	1.4	0.0
		t) Health of residents	0.5	0.4	0.4	0.0
		u) Other	10.0	7.9	8.9	11.8
		v) Don't Know / No Answer	21.9	19.2	20.5	17.6
16.	In YOUR opinion can concerns that people have expressed about the project be addressed so that the project can proceed? (Sample: 456)	a) Yes	47.2	39.1	43.0	45.9
		b) No → Why Not? (Sample: 119)	28.9	23.5	26.1	29.7
		• Project will proceed regardless	28.5	18.2	23.7	20.1
		• People do not want the project to proceed	14.4	8.9	11.8	9.0
		• Too many environmental issues	6.7	12.0	9.2	16.6
		• Too many unanswered questions	6.6	6.8	6.7	8.8
		• Just not a good idea for the area	2.2	5.7	3.8	6.3
		• No compensation for fishermen	2.2	4.4	3.2	
		• Big companies have no concern for project impacts	2.2	4.5	3.2	
		• Need to protect the fishery / lobster fishery	2.2	1.9	2.1	
		• Because of impacts on people	2.6	0.0	1.4	
		• Don't trust the companies	0.0	2.4	1.1	
		• Other	28.1	37.0	32.3	
		• Don't Know / No Answer	6.6	4.9	5.8	
		c) Don't Know / No Answer	23.9	37.4	30.9	24.3
17.	Based on what you know about the White's Point Project, do you support the project? (Sample: 456)	a) Yes	42.9	19.0	30.5	30.6
		b) No	44.3	51.9	48.2	58.3
		c) Don't Know / No Answer	12.8	29.1	21.3	11.1
18.	Do you feel that you have had sufficient opportunity to participate in discussions regarding the project? (Sample: 456)	a) Yes	53.0	46.8	49.8	65.7
		b) No → Why Not? (Sample: 179)	37.9	40.5	39.3	28.6
		• Does not concern them / Not interested	23.0	32.0	27.8	13.2
		• Have heard too much about it	21.3	15.8	18.3	13.2
		• Need more information	19.5	8.3	13.4	15.5
		• Doesn't live in the area	10.5	12.3	11.5	

		• Would like more public meetings / information	11.2	8.2	9.6	20.7
		• Need more promotion / advertising	7.7	3.4	5.4	
		• Meetings are held too far away	1.1	4.2	2.7	
		• Other	4.7	6.9	5.9	31.5
		• Don't Know / No Answer	2.9	9.0	6.2	
		c) Don't Know / No Answer	8.7	12.7	10.7	5.7
		d) Refused	0.5	0.0	0.2	0.0
19.	Do you have any other comments? (Sample:457)	a) Yes				
		<u>Positive:</u>				
		• Hope it goes ahead and boosts economy	2.9	1.9	2.4	
		• The project will bring lots of jobs to the area	3.4	0.3	1.8	4.5
		• Government looks long and hard before proceeding	0.3	2.0	1.2	3.5
		• Things should be fine	0.4	1.1	0.8	3.9
		• Digby should get benefits promised	0.4	0.3	0.3	
		• Other	6.4	5.6	6.0	7.7
		<u>Negative:</u>				
		• Hope it does not proceed	5.3	4.5	4.9	6.9
		• Would like / needs more information/ updates more often	1.5	3.8	2.7	2.5
		• People in the area are very opposed	2.8	1.3	2.0	
		• Should not let our resources to be taken away	1.7	1.5	1.6	9.2
		• Have not heard enough to form an opinion	1.9	0.6	1.2	
		• Will affect the environment	0.4	0.3	0.4	
		• What will happen to site once developer goes	0.4	0.0	0.2	
		• Property values will decrease	0.4	0.0	0.2	2.2
		b) No	73.9	77.5	75.7	62.2
20.	Can you name the company that is developing the White's Point Quarry? (Sample: 457)	a) Bilcon	5.9	5.5	5.7	19.4
		b) No	90.4	92.0	91.2	77.8
		c) Other	3.7	2.5	3.0	2.8

21.	Where does the company come from? (Sample: 457)	a) United States b) Canada c) Other d) Don't Know / No Answer	69.4 0.9 1.8 27.9	60.3 1.3 1.7 36.8	64.6 1.1 1.7 32.5	91.7 0.0 0.0 8.3
22.	What do you think is the best way to inform the community about development projects in the Digby area? (Sample: 476)	a) Local newspaper b) Public Information sessions c) Radio / TV d) Mail out surveys e) Community group f) Government g) General media h) Internet i) Other / community newspapers j) Door to door k) Other l) Don't Know / No Answer	60.8 35.5 30.1 18.4 17.1 10.2 1.8 1.3 1.0 1.1 2.6 5.9	59.0 33.6 33.4 23.7 15.2 3.3 0.7 1.5 0.6 0.3 3.0 4.8	59.8 34.5 31.8 21.2 16.1 6.6 1.2 1.4 0.8 0.7 2.8 5.4	46.2 33.0 21.8 25.2 43.6 10.4 9.8 0.0 0.0 3.2 2.2 10.2
23.	Gender: (Sample: 476)	a) Male b) Female			44.9 55.1	47.2 52.7
24.	Is your permanent residence in Digby County? (Sample:476)	a) Yes b) No → What is your permanent residence (Sample: 106) • Annapolis County • Other • Refused	80.7 19.3 75.6 22.2 2.2	74.2 25.0 78.1 14.1 7.8	77.3 22.3 77.1 17.4 5.5	100.00
25.	What brings you to Digby County at this time? (Sample: 29)	a) Shopping b) Visiting relatives c) Summer home d) Other e) Don't Know / No Answer / refused	0.0 0.0 9.1 18.2 72.8	22.2 16.7 5.6 5.6 50.0	13.8 10.3 6.9 10.3 58.6	N/A
26.	How often do you visit Digby County? (Sample: 29)	a) Once per year b) Twice per year c) More than 4 times per year d) Refused	10.0 10.0 50.0 30.0	0.0 5.3 63.2 31.6	3.4 6.9 58.6 31.0	N/A

27.	How long do you usually stay in the area when you visit? (Sample: 31)	a) Less than a month b) 1-2 months c) 5-6 months d) more than 6 months e) Day trip f) Refused	9.1 0.0 18.2 0.0 45.5 27.3	20.0 5.0 5.0 5.0 35.0 30.0	16.1 3.2 9.7 3.2 38.7 29.0	N/A
28.	Age (Sample:476)	a) 18-30 b) 31-40 c) 41-50 d) 51-60 e) 61-70 f) over 70 g) Refused	15.8 18.9 20.2 18.4 12.7 14.0 0.0	14.5 16.9 18.5 16.9 12.9 19.0 1.2	15.1 17.9 19.3 17.6 12.8 16.6 0.6	17.1 17.1 20.0 17.1 11.4 17.1 0.0
29.	Are you currently working? (Sample: 476)	a) Yes • Full time • Part Time b) No c) Refused	57.5 89.3 10.7 42.1 0.4	42.7 75.5 24.5 56.9 0.4	49.8 83.1 16.9 49.8 0.4	50.0 82.4 17.6 50.0
30.	What is you occupation? (Sample: 477)	a) Management Occupations b) Business, Finance and Administrative Occupations c) Natural and Applied Sciences and Related Occupations d) Health Occupations e) Occupations in Social Sci., Education, Govt. service and Rel f) Occupations in Art, Culture, Recreation and Sport g) Sales and Service Occupations h) Trades, Transport and Equipment Operators and Related Occupations i) Occupations Unique to Primary Industry j) Occupations Unique to Processing, Manufacturing and Utilities k) Retired l) Unemployed/homemaker/stay at homemom m) Laborer n) Disabled	5.7 2.6 3.9 2.2 3.9 0.9 7.8 15.2 16.5 3.5 27.4 1.7 1.7 0.9	4.5 11.7 0.4 6.9 6.9 1.2 7.7 0.4 3.2 0.0 32.0 15.8 1.2 0.8	5.0 7.3 2.1 4.6 5.5 1.0 7.8 7.5 9.6 1.7 29.8 9.0 1.5 0.8	2.7 10.8 5.4 2.7 10.8 2.7 5.4 18.9 2.7 24.3 10.8 0.0 0.0

		o) Student p) Other Mentions q) Refused	1.7 3.5 0.9	2.0 3.2 2.0	1.9 3.4 1.5	0.0 0.0 2.7
31	What is your highest level of education? (Sample: 477)	a) Less than grade 9 b) Grade 9 c) High School d) College Diploma e) Some University f) University graduate g) Masters or PHD h) Refused	8.3 14.0 30.1 22.7 6.1 11.4 7.0 0.4	4.0 8.9 32.3 24.2 7.7 16.5 5.2 1.2	6.1 11.3 31.2 23.5 6.9 14.0 6.1 0.8	13.9 5.6 36.1 13.9 2.8 13.9 11.1 2.8

White's Point Survey Attitude Survey
Responses to Select Questions by Age Group
Total Sample

# from original survey	Question	Responses	18-30	31-40	41-50	51-60	61-70	Over 70
1.0	Have you heard of the White's Point Quarry	a) Yes	97.7	92.9	99.1	94.4	98.8	93.8
		b) No	2.3	7.1	0.9	5.6	1.2	6.3
5.0	Have you heard opinions expressed about the (White's Point Quarry)?	a) Yes	88.1	89.2	89.6	87.2	83.8	75.6
		b) No	9.5	7.7	9.4	12.0	13.8	22.2
		c) Don't Know / No Answer	2.4	3.1	0.9	0.9	2.5	2.2
6.0	Overall, do you think the White's Point project is a good project for Digby County?	a) Yes	31.0	32.3	34.0	26.5	28.8	17.8
		b) No	26.2	40.0	30.2	47.0	45.0	55.6
		c) Don't Know / No Answer	42.9	27.7	35.8	26.5	26.3	26.7
7.0	Do YOU believe the project will create jobs that will be important to Digby County?	a) Yes	64.3	60.0	57.5	53.8	46.3	42.2
		b) No	16.7	27.7	26.4	38.5	40.0	33.3
		c) Don't Know / No Answer	19.0	12.3	16.0	7.7	13.8	24.4
	How many jobs do you think the project will provide	a) 10-20	8.3	5.1	3.1	7.6	5.9	5.6
		b) 21-50	8.3	11.9	12.5	8.6	14.7	11.1
8.0	In YOUR opinion will the White's Point project affect the area's natural environment?	a) Yes	59.5	61.5	65.1	79.5	76.3	64.4
		b) No	14.3	18.5	15.1	11.1	13.8	15.6
		c) Don't Know / No Answer	26.2	20.0	19.8	9.4	10.0	20.0
9.0	In YOUR opinion will the project affect the overall well-being and quality of people's lives in Digby County?	a) Yes	35.7	46.2	53.8	56.4	61.3	53.3
		b) No	33.3	36.9	27.4	25.6	15.0	13.3
		c) Don't Know / No Answer	31.0	16.9	18.9	17.9	23.8	33.3
10.0	In YOUR opinion will the project affect tourism opportunities in Digby County?	a) Yes	33.3	29.2	38.7	43.6	47.5	37.8
		b) No	42.9	50.8	40.6	44.4	41.3	35.6
		c) Don't Know / No Answer	23.8	20.0	20.8	12.0	11.3	26.7
11.0	In YOUR opinion will the project affect local traditional activities?	a) Yes	31.0	26.2	34.9	44.4	45.0	31.1
		b) No	47.6	55.4	38.7	31.6	37.5	33.3
		c) Don't Know / No Answer	21.4	18.5	26.4	23.9	17.5	35.6

12.0	In YOUR opinion will the coastline near the project be affected by the project?	a) Yes b) No c) Don't Know / No Answer	57.1 16.7 26.2	60.0 10.8 29.2	68.9 16.0 15.1	71.8 12.0 16.2	67.5 15.0 17.5	64.4 15.6 20.0
13.0	In YOUR opinion will the project have an affect on the local lobster fishery?	a) Yes b) No c) Don't Know / No Answer	42.9 21.4 35.7	36.9 27.7 35.4	50.9 17.9 31.1	56.4 20.5 23.1	48.8 17.5 33.8	46.7 22.2 31.1
14.0	In YOUR opinion will the project affect Digby County's economy?	a) Yes b) No c) Don't Know / No Answer	66.7 16.7 16.7	73.8 15.4 10.8	67.9 12.3 19.8	70.9 20.5 8.5	63.8 25.0 11.3	51.1 22.2 26.7
16.0	In YOUR opinion can the concerns that people have expressed about the project be addressed so that the project can proceed?	a) Yes b) No c) Don't Know / No Answer	61.9 7.1 31.0	53.8 23.1 23.1	39.6 28.3 32.1	38.5 36.8 24.8	36.3 28.8 35.0	26.7 31.1 42.2
17.0	Based on what you know about the White's Point Project, do you support the project?	a) Yes b) No c) Don't Know / No Answer	35.7 38.1 26.2	40.0 36.9 23.1	34.9 46.2 18.9	22.2 58.1 19.7	23.8 55.0 21.3	20.0 57.8 22.2
18.0	Do you feel that you have had sufficient opportunity to participate in discussions regarding the project?	a) Yes b) No c) Don't Know / No Answer	50.0 38.1 11.9	49.2 43.1 7.7	50.0 38.7 10.4	50.4 37.6 12.0	56.3 32.5 11.3	44.4 44.4 11.1

Whites Point Quarry
Basalt Rock - Metals

ANALYTE	Units	EQL	Sample RWP - 01-5	RWP - 01- 33	RWP - 01 - 61
MN03 Peroxide Digestion		-	20041231 - A	20041231 - A	20041231 - A
Aluminum	mg/kg	10	14000	24000	17000
Antimony	mg/kg	2	nd	nd	nd
Antimony Recovery	%	-	40	40	40
Arsenic	mg/kg	2	nd	nd	nd
Barium	mg/kg	5	66	30	93
Beryllium	mg/kg	2	nd	nd	nd
Boron	mg/kg	5	nd	nd	nd
Cadmium	mg/kg	0.3	nd	nd	nd
Chromium	mg/kg	2	18	89	58
Cobalt	mg/kg	1	14	16	12
Copper	mg/kg	2	27	48	170
Iron	mg/kg	50	20000	22000	23000
Iron Recovery	%	-	80	80	80
Lead	mg/kg	0.5	4.2	1	1.5
Manganese	mg/kg	2	190	170	300
Molybdenum	mg/kg	2	nd	13	16
Nickel	mg/kg	2	32	120	130
Selenium	mg/kg	2	nd	nd	nd
Silver	mg/kg	0.5	nd	nd	nd
Strontium	mg/kg	5	130	57	44
Thallium	mg/kg	0.1	nd	nd	nd
Uranium	mg/kg	0.1	0.6	0.2	0.2
Vanadium	mg/kg	2	37	45	41
Zinc	mg/kg	5	52	29	43
Sulphur Sub	% (w)	0.02	0.02	nd	0.02

Legend

EQL = Estimated Quantitation Limit is the minimum concentration that can be reliably reported. It is not a regulatory limit.

nd = Not Detected, instrument did not detect anything above standard EQL.

nd () Not Detected at the elevated EQL specified, due to matrix interference or sample pre-dilution.

- Dash is reported when parameter not requested in sample.

Note: Soil results are expressed as air dry weight basis.

Maxxam Job #: A582491
Report Date: 2005/09/14

ATLANTIC METALS IN TERRESTRIAL BIOTA (TISSUE)

Maxxam ID		H86172
Sampling Date		
	Units	**DEWBERRY N44 *27.43-W-66*-8.495**
Elements (ICP-MS)		
Available Aluminum (Al)	mg/kg	0.9
Available Antimony (Sb)	mg/kg	ND
Available Arsenic (As)	mg/kg	ND
Available Barium (Ba)	mg/kg	0.89
Available Beryllium (Be)	mg/kg	ND
Available Boron (B)	mg/kg	3
Available Cadmium (Cd)	mg/kg	0.011
Available Chromium (Cr)	mg/kg	ND
Available Cobalt (Co)	mg/kg	ND
Available Copper (Cu)	mg/kg	0.88
Available Iron (Fe)	mg/kg	4.6
Available Lead (Pb)	mg/kg	ND
Available Manganese (Mn)	mg/kg	30
Available Molybdenum (Mo)	mg/kg	0.05
Available Nickel (Ni)	mg/kg	0.13
Available Selenium (Se)	mg/kg	ND
Available Silver (Ag)	mg/kg	ND
Available Strontium (Sr)	mg/kg	2.2
Available Thallium (Tl)	mg/kg	0.004
Available Uranium (U)	mg/kg	ND
Available Vanadium (V)	mg/kg	ND
Available Zinc (Zn)	mg/kg	1.5
Elements (ICP-OES)		
Available Sulphur (S)	mg/kg	ND

ND = Not detected

Bilcon of Nova Scotia
Client Project #:
Project name:
Sampler Initials:

H86188	H86189	
DEWBERRY N44 *27.799-W-66*-8.589	**LOWBUSH BLUEBERRY N44*-27.861W-66*-8.64**	**DL**
0.7	0.9	0.1
ND	ND	0.02
ND	ND	0.02
0.1	0.26	0.05
ND	ND	0.02
3.7	1.9	0.05
0.004	ND	0.003
0.04	ND	0.02
ND	ND	0.01
0.95	0.49	0.02
4.8	3.5	0.5
0.008	ND	0.005
9.7	8.4	0.02
0.11	ND	0.02
0.08	0.07	0.02
0.03	ND	0.02
ND	ND	0.005
1.7	0.29	0.05
0.007	ND	0.001
ND	ND	0.001
ND	ND	0.02
1.7	0.84	0.05
ND	ND	500

H86190		H86191	
WILD RASBERRY N44*27.430-W66*-8.495	**DL**	**WILD RASBERRY N44*-27.844W-66*8.616**	**DL**
ND	1	0.4	0.1
ND	0.2	ND	0.02
ND	0.2	ND	0.02
0.8	0.5	3.6	0.05
ND	0.2	ND	0.02
3.4	0.5	2.1	0.05
ND	0.03	0.007	0.003
ND	0.2	ND	0.02
ND	0.1	ND	0.01
0.8	0.2	0.53	0.02
9	5	4.6	0.5
ND	0.05	0.005	0.005
31	0.2	4.2	0.02
ND	0.2	0.05	0.02
0.4	0.2	0.23	0.02
ND	0.2	ND	0.02
ND	0.05	ND	0.005
1.9	0.5	3.9	0.05
ND	0.01	0.003	0.001
ND	0.01	0.002	0.001
ND	0.2	ND	0.02
4.1	0.5	2.5	0.05
660	500	ND	500

GENERAL COMMENTS

Arsenic is 72 %, iron is 73 %, selenium is 59% and thallium is < 10 % recovery in the digested blank spike for Work Sheet # 813926.

Aluminum is 43 % and chromium is 66 % recovery in the digested reference material for Work Sheet # 813926.
Sample H86190-01: Elevated reporting limits for trace metals due to matrix interferences.

Aluminum is 138 %, cadmium is 72 %, lead is 61 %, selenium is 73 % and thallium is < 10 % recovery in the digested matrix spike.

Results relate only to the items tested.

amec

List of Bilcon's Communications Activities 2002-2005

Selected digest of Activities to Inform and Elicit Public Comment and Concerns Relative to Whites Point Quarry and Marine Terminal Project.

INCLUDES:

- Meetings/consultations or correspondence with NGOs or other representative of environmental or indigenous public opinion
- Press conferences, publications, or other Bilcon-initiated media activity with project-related content
- Open meetings with members of public or special-interest groups, with project-related content
- Open meetings with administration or elected officials, not essential for project, with purpose of informing, advising or exchanging views

EXCLUDES:

- Closed meetings with administration officials, required for project
- Meetings with Bilcon employees, hired consultants/contractors, or business negotiations with potential consultants/contractors
- Media coverage not initiated by Bilcon
- Community or cultural activities sponsored by Bilcon, lacking specific project-related content

Note: * Indicates number of participants, excluding Bilcon, when known.

List of Whites Point Communications Activities

Date	Location	Subject	Participants	Number of Participants*
July 18, 2002	Sandy Cove Fire Hall	Issues scoping, development of the Community Liaison Committee (CLC), public consultation	CLC	4
Aug 15, 2002	Site Visit	General site visit	CLC, general public,	unknown
Aug. 18, 2002	Sandy Cove Fire Hall	Issues scoping, public consultation	CLC, landowners, members of the general public, Provincial Government	11
Aug. 29, 2002	Sandy Cove Fire Hall	Issues scoping, public consultation	CLC, landowners, members of the general public	10
September 25, 2002	Sandy Cove Fire Hall	Issues scoping, public consultation	CLC, members of the general public	11
October 24, 2002	Sandy Cove Fire Hall	Issues scoping, public consultation	CLC, members of the general public	16
November 2002	Digby	Issues scoping, public consultations	Municipal Council	7
November 21, 2002	Rossway Community Hall	Issues scoping, preliminary hydro-geological report presentation, public consultation	CLC, members of the general public, Jacques Whitford	15
January 9, 2003	Rossway Community Hall	Issues scoping, public consultation	CLC, members of the general public	19
January 30, 2003	Rossway Community Hall	Issues scoping, public consultations	CLC, members of the general public	8
March 12, 2003	Rossway Community Hall	Issues scoping, public consultations	CLC, members of the general public, provincial government	24
April 9, 2003	Rossway Community Hall	Issues scoping, public consultation	CLC, members of the general public, CBC	19
April 30, 2003	Rossway Community Hall	Issues scoping, public consultation	CLC, members of the general public	8
June 11, 2003	Rossway Community Hall	Issues scoping, public consultation, presentation on Ballast Water	CLC, members of the general public, Mallet Research Services	20
July 9, 2003	Whites	Site Tour	CLC, members of the	7

Date	Location	Subject	Participants	Number of Participants*
	Point		general public	
August 27, 2003	Rossway Community Hall	Issues scoping, public consultation	CLC, members of the general public, landowner, CBC, archeologist	27
October 8, 2003	Rossway Community Hall	Issues scoping, public consultation	CLC, members of the general public, Digby Courier, Jasco Research Ltd.	14
November 4th, 2003	Bilcon Office	Issues scoping, public consultations	Whites Cove Lobster Fishermen	4
November 21, 2003	Digby Neck	Issues scoping, casual conversations	Little River Trading Company, Royce Eldrikin	1
December 15, 2003	Bilcon Office	Open House	Digby Municipal Council, Tourism Operators, interested community members	19
December 16, 2003	Digby Neck	Issues scoping, public consultation	Ossinger Groceries, Barbara Ossinger	1
December 16, 2003	Digby Neck	Issues scoping, public consultation	Straight from the Hearth, Roger and Dorothy Outhouse	2
December 17, 2003	Digby Neck	Issues scoping	Sandy Cove Grocery, Penny and Steve Naughler	2
December 17, 2003	Digby Neck	Issues scoping	Wilson's on the Neck, Randy and Cindy Nesbitt	2
December 18, 2003	Digby Neck	Issues scoping	D.B. Kenney Fisheries Ltd.	2
December 2003	Digby Neck	Issues scoping	Small Ideas Crafts and Gifts	1
December 2003	Digby Neck	Issues scoping	Spruce Grove Arts and Crafts, Lewis Walker	1
December 2003	Digby Neck	Issues scoping	Dock & Doze, Patsy Titus	1
December 2003	Tiverton Ferry Wharf	Issues scoping	Well House Curios Central Grove, Louise Chisholm	1
December 2003	Digby Neck	Issues scoping	Graham's Store	
December 2003	Digby Neck	Issues scoping, public consultations	Freeport House Bed & Breakfast, Andy Moir and Chris Callighan	2
December 2003	Digby Neck	Issues scoping, public consultations	Petite Passage/Whale Watch	1

Date	Location	Subject	Participants	Number of Participants*
December 2003	Digby Neck	Issues scoping, public consultations	Rambling Rowes, Harold Rowe	1
December 2003	Digby Neck	Issues scoping, public consultations	Graham's Pioneer Retreat, Linda and David Graham	2
December 2003	Digby Neck	Issues scoping, public consultations	Mariner Restaurant, Sandy Cove	1
December 2003	Digby Neck	Issues scoping, public consultations	Whale Cove, Vaughan Tidd	1
December 2003	Digby Neck	Issues scoping, public consultations	Brier Island Whale & Seabird	1
December 2003	Digby Neck	Issues scoping, public consultations	Islands Historical Society	
December 2003 – February 2005	Digby Neck	Issues scoping, public consultations	Freeport Whale & Seabird	1
December 2003- November 2004	Digby Neck	Issues scoping, informal discussions	Ocean Trawlers Ltd., Fred and Stephanie Trask	2
December 2003 – April 2004	Digby Neck	Informal discussions	Brambles and Roses Gifts, Don Mullen	1
December 2003 – April 2004	Digby Neck	Issues scoping, informal discussions	Pirates Cove, Alger Sollows Whale Watching	1
December 2003 – July 2004	Digby Neck	Casual Conversations	Gallery by the Sea, Tom Goodwin	1
November – December 2003 to October 2004	Digby	Issues scoping, informal discussions	Members of Council of the Municipality of Digby	7
January 2004	Digby Neck	Issues scoping, casual conversations	Little River Trading Company, Royce Eldrikin	1
January 2004	Digby Neck	Issues scoping, public consultations	Petite Passage/Whale Watch	1
January 2004	Digby Neck	Issues scoping, public consultations	Mariner Restaurant, Sandy Cove	1
January 2004	Digby Neck	Issues scoping, public consultations	Graham's Pioneer Retreat, Linda and David Graham	2
January 22,	Digby Neck	Issues scoping	D.B. Kenney Fisheries Ltd.,	2

Date	Location	Subject	Participants	Number of Participants*
2004			Penny Graham and spouse	
February 2004	Digby Neck	Issues scoping	Moby Dick	1
February 11, 2004	Bilcon Office	Issues scoping, public consultations	Whites Cove Lobster Fishermen	4
February 13, 2004	Digby	Issues scoping, public consultations	Digby and Area Board of Trade	22
February 19, 2004	Digby Neck	Issues scoping	Aquaculture Association of Nova Scotia, Rodney O'Neil	1
March 10, 2004	Bilcon Office	Issues scoping	Whites Cove Lobster Fishermen	4
March 2004	Digby Neck	Issues scoping, public consultation	Brier Island Lodge, Ray Tudor	1
April 2004	Bear River	Issues scoping, public consultation	Band Councilor and Economic Development Officer of Bear River First Nations Reserve	2
April – May 2004	Digby Neck	Issues scoping	Gibson's Landing	3
May 2004	Digby Neck	Issues scoping	R.E. Robicheau Store, Wally DeVries	1
May 2004	Digby Neck	Issues scoping, public consultation	Brier Island Lodge, Ray Tudor	1
June – July 2004	Digby Neck	Issues scoping, public consultation	Basin Charters	1
June 2004	Digby Neck	Issues scoping, casual conversation	Ferry Take-Out Seaside Lunch	2
June 2004	Digby Neck	Issues scoping, public consultation	Digby Neck Consolidated School	1
June 2004	Digby Neck	Issues scoping, public consultation	EMH (Long Island and Brier Island Primary Care Project)	1
June 2004	Digby Neck	Issues scoping, public consultation	Islands Consolidated School	1
July 2004	Digby Neck	Issues scoping, public consultation	Petite Passage/Whale Watch	2
July 2004	Digby Neck	Issues scoping, public consultation	Bay to Bay Adventures	1
August 2004	Digby Neck	Issues scoping	Aquaculture Association of Nova Scotia	1
The October 2004 Council	Digby	Issues scoping, public consultation	Municipality of Digby	4

Date	Location	Subject	Participants	Number of Participants*
October 2004	Digby Neck	Issues scoping	Aquaculture Association of Nova Scotia	1
November 16, 2004	Digby	Public consultation	Crime Prevention Committee	3
December 2004	Digby Neck	Issues scoping, casual conversation	Little River Trading Company, Royce Eldrikin	1
December 2004	Digby Neck	Issues scoping, public consultation	Tiny Tattler, Edwin Ossinger	1
December 6, 2004	Digby	Issues scoping, public consultation	Municipal Council	7
December 7 and 8, 2004	Bilcon Office	Open House	Potential suppliers, tourism operators, interested community members, members of the Sierra Club	33
January 2005	Digby Neck	Issues scoping, public consultation	Digby Neck and Islands Tourism Association, Mr. Ross and Mrs. Graham	2
January 2005	Digby Neck	Issues scoping, casual conversations	Little River Trading Company, Royce Eldrikin	1
January 4, 2005	Bear River	Issues scoping, public consultation	Bear River First Nations	17
January 6, 2005	Sandy Cove	Joint Review Panel, Scoping Meeting	Panel Members, CEAA, NSEL, members of the general public	21 (extracted from meeting minutes)
January 7, 2005	Digby	Joint Review Panel, Scoping Meeting	Panel Members, CEAA, NSEL, members of the general public	18 (extracted from meeting minutes)
January 8, 2005	Wolfville	Joint Review Panel, Scoping Meeting	Panel Members, CEAA, NSEL, members of the general public	18 (extracted from meeting minutes)
January 9, 2005	Meteghan	Joint Review Panel, Scoping Meeting	Panel Members, CEAA, NSEL, members of the general public	16 (extracted from meeting minutes)
February 2004	Digby Neck	Issues scoping, casual conversations	Little River Trading Company, Royce Eldrikin	1
February 15, 2005	Bilcon Office	Tourism Industry Consultation, Informal information session/open house	Operators of accommodations, restaurants, adventure tourism operators, etc.	4
March 31 - April 1, 2005	Digby	Career Fair	Members of the general public	213
March 2004	Digby Neck	Issues scoping, casual	Little River Trading	1

Date	Location	Subject	Participants	Number of Participants*
		conversations	Company, Royce Eldrikin	
April 15 to May 10, 2005	Digby Neck	Issues scoping, casual conversations	Digby Neck and Islands Traditional Knowledge Interviews	57
May 12, 2005	Weymouth	Issues scoping, public consultation	Weymouth Falls Community Development Association	2
September 21, 2005	Digby Neck	Issues scoping, public consultation	Briar Islands Lodge, Diane and Bill Briar	2
September 21, 2005	Digby Neck	Issues scoping, public consultations	Ocean Explorations, Tom Goodwin	1
September 22, 2005	Digby Neck	Issues scoping, public consultation	Linda Graham, Digby Neck and Islands Tourism Association	1
September 22, 2005	Tiverton	Issues scoping, public consultation	John Ivans, Fisherman	1
September 22, 2005	Yarmouth	Issues scoping, public consultation	Dianna Surette, Decision Support Analyst, Southwestern District Health Authority	1
November 2003 – July 2005	Various locations in Target Area	Issues scoping, public consultation, casual conversations with individual in the target area	Mr George Gavel, Mr. Charles Thibodeau Sr., Mr. Woodrow Outhouse, Mr. Edward and Mrs. Faith Theriault, Mr. Fredrick Horner, Mr. Roger Tidd, Mr. Bruce Theriault, Ms. Wanda Van Tassell, Mr. Rodney O'Neill, Mr. & Mrs. Charles Thibodeau Jr., Mr. Randy & Mrs. Cindy Nesbitt, Mr. Harold Rowe, Mr. Andy Moir, Mr. Roger Outhouse, Mr. Emerson Carty, Mr Louis Walker, Mr & Mrs. Stephen Naughler, Mr. David & Mrs. Linda Graham, Mr. Peter Morehouse, Ms. Dianne Young, Mr. James Outhouse, Mr. Terry Gidney, Mrs. Stephanie Trask, Mr. Harold & Mrs. Genie Wilkins, Mr. Pat & Mrs. Kim Lamarche	32
November 2003 – July	Various locations in	Issues scoping, public consultation, casual	Mr. Vance Hazelton, Mr. Reg Hazelton, Mr & Mrs. H.	34

Date	Location	Subject	Participants	Number of Participants*
2005	and outside the Target Area	conversations with individual in the target area	Robicheau, Mr. Micheal Bartlett, Mr. Robert Eisner, Mr. Murray Trask, Mr. Ken Woodman, Mr. & Mrs. Roger Marshall, Ms. Cindy Amero, Mr. & Mrs. Richard Treleaven, Mr. Edward Reid, Mr. Lester Barstow, Father Adrian Potter, Mr. Will Huntley, Mr. James M. Wheelhouse, Mr. Oren & Mrs. Susanna Foster, Dr. L. R. Denton, Mr. Frank Marshall, Mr & Mrs. Jack Morell, Mr. Leroy Morell, Mr. Bud Winchester, Mr. & Mrs. John MacKinnon, Mrs. Faye Haley, The Honourable Gordon Balser, Ms. Anne Marie Hazel, Mrs. Elizabeth Agar, Ms. Maureen Potter, Mr. Ken & Mrs. Maxine Connell, Mr. John Levings	
November 2003 – July 2005	Various locations in and outside the Target Area	Fundraising requests and information exchange	Mrs. Jean Marshall, Chair Digby County Exhibition; Mrs. Brenda Lewis, RCMP Senior Safety Program; Constable Corey Bushell, Digby Crime Prevention Committee Liaison; Mrs. Pat Haliburton, Digby Crime Prevention Committee; Mr. Alan Ferguson, Educator Tiverton Resident; Mr. Ben Elms, Principal, Digby Regional High School; Mrs. Bev Ross, Guidance Counsellor, Digby Regional High School	7
November 2003 – July 2005		Issues scoping, public consultation	Ms. Marlene Cole, Weymouth & Area Counselling Services/Weymouth Falls Community	1
November 2003 – July 2005		Issues scoping, public consultation	Mrs. Gail Jarvis, Candidate for Municipal Council, Black Women's Health Project	1

Date	Location	Subject	Participants	Number of Participants*
November 2003 – July 2005	Via telephone, letter and other public meetings	Issues scoping, public consultation	Ms. Christine Callighan, Ms. Mary MacCarthy, Mr. Terry Farnsworth, Mr. Kemp Stanton (Partnership for Sustainable Development)	4
November 2003 – July 2005	Digby Neck	Issues scoping, federal government services	Canadian Coast Guard Services, Westport	2
November 2003 – July 2005	On the Freeport/ Tiverton Ferry, Bilcon Office	Issues scoping, provincial government services	Peter Morehouse, Provincial Government Ferry Services, David Comeau (Digby) and Paul Stone (Middleton), Road Services, and the Nova Scotia Department of Health	12
November 2003 – July 2005	Digby Neck	Issues scoping, volunteer services	Digby Neck Fire Department, Tiverton Volunteer Fire Department, Freeport Volunteer Fire Department, Fundy Ground Search and Rescue	13
	Digby	Issues scoping	Brian Cullan, CAO Municipality of Digby	1
	Freeport and Digby	Issues scoping, economic development strategies for Digby County	Jim Thurber, Warden of Municipality of Digby	1
	Cornwallis	Economic development strategies, role of tourism industry in the area	Megan Moore and Leslee Fredericks, Western Valley Development Association	2
	Cornwallis and Bilcon Office	Fisheries	Bill Whitman, Provincial Fisheries	1
December 2003	Digby Neck	Aquaculture development/winter storm, informal discussion	R & R Finfish Development Ltd., Sean Raymond	1
December 2003	Digby Neck	Informal discussion	Scotia Fisheries Limited, Alan Walker	1

FOR YOUR INFORMATION

Facts Sheet
No. 1
January, 2003

WHITES COVE PROJECT

PROJECT SUMMARY

A permit (#2002-026397) was issued by the Nova Scotia Department of Environment and Labour, effective as of April 30, 2002, for the construction and operation of a quarry with an area of less than 4 Ha.(10-acre) in Whites Cove. This permit expires on April 30, 2012.

A permit application will soon be submitted for a quarry exceeding 4 Ha. in the same general area. As well, a permit will be sought for the construction and operation of a marine terminal at Whites Cove to enable the crushed rock to be exported to the U.S.

Approximately 2,000,000 tons of rock will be crushed and shipped per year.

WHY HERE?

The Whites Cove area of Digby Neck is composed of a thick layer of basalt rock, which, when processed, becomes a high quality aggregate for use in concrete and road paving. The location of the site, on the Western side of the Neck is ideal for several reasons:

1) It is water accessible, and therefore a convenience and advantage for shipping to the markets for aggregate stone. Because the stone is removed by ship, there will be minimal truck traffic from the site in the community.
2) The quarry will not be visible from Route 217 or from anywhere on the Eastern side of the Neck.
3) The ridge of the North Mountain provides some protection from typical quarry noise.
4) The Proponent believes that there is a pool of skilled and highly motivated people on Digby Neck capable of operating this project.

THE PERMIT PROCESS

FOR A 4 HA. (10 ACRE) SITE

1) An application was made to the Nova Scotia Department of Environment and Labour resulting in an Approval to Construct and Operate a less than 4 Ha. quarry on a 370 acre site in Whites Cove.
2) No environmental assessment was required as part of the application for the 4 Ha. permit.
3) Terms & Conditions were attached to the Approval, and form part of the Approval. Copies of the Approval and Terms and Conditions have been made available to the Community Liaison Committee.

FOR A LARGER QUARRY

1) An application will be made to the Nova Scotia Department of Environment and Labour in 2003 for approval to operate a quarry, exceeding 4 Ha. on the same 370 acre site in Whites Cove.
2) The application will require a thorough and rigorous environmental assessment.
3) The environmental assessment is ongoing and many aspects have already been discussed with the Community Liaison Committee, and will continue to be discussed at future Community Liaison Committee meetings.
4) As it is the intention to ship the crushed rock from a 'purpose built' marine terminal in Whites Cove, an Approval will be sought in 2003 for the construction of the marine terminal under the Navigable Waters Protection Act.
5) The application under the Navigable Waters Protection Act will be assessed to determine whether a Canadian Environmental Assessment is required. It is assumed that a Canadian Environmental Assessment will be required for this project.

THE COMMUNITY LIAISON COMMITTEE

As stated under Section B of Section 11, Public Communications of the Terms and Conditions of the Approval to Construct and Operate the less than 4 Ha quarry: "At the request of the Department, the Proponent shall establish a Community Liaison Committee…". The Department of Environment and Labour notified the Proponent on June 7, 2002, that under Section 11, a Community Liaison Committee should be established. (Copies of the of the 'Guidelines for the Formation of a Community Liaison Committee' are available upon request.) The first meeting of the CLC was held on July 18, 2002 at the Sandy Cove Fire Hall.

As Mr. Robert Petrie, District Manager of NSDOEL, confirmed at the public meeting of August 8, 2002, the Committee is a forum for the exchange of information between the public and the company. He also noted that, "There is nothing to say that all members have to agree".

The Committee, is composed of members of the community, with diverse interests and opinions whose main function is to enable the company and the community to communicate information and answer the community's questions and concerns.

The Community Liaison Committee will continue to function in this capacity throughout the duration of the project.

The current Community Liaison members are:

Ms. Cindy Nesbitt - chair	Ms. Judith Cary
Mr. Brian Cullen	Mr. David Graham
Ms. Christine Harnish	Mr. John Ivens
Mr. Mark Jeffrey	

Dates of Past Meetings:

July 18, 2002,	Sandy Cove Fire Hall
August 8, 2002,	Sandy Cove Fire Hall
August 29, 2002,	Sandy Cove Fire Hall
September 25, 2002,	Sandy Cove Fire Hall
October 24, 2002,	Sandy Cove Fire Hall
November 21 , 2002,	Rossway Community Hall
January 9, 2003,	Rossway Community Hall

All Minutes are available upon request.

WHO ARE THE PROPONENTS?

NOVA STONE EXPORTERS INC. — Holds the permit for the 4 Ha. quarry.
GLOBAL QUARRY PRODUCTS — Subsidiary of Nova Stone Exporters Inc. - Will operate the quarry

Contact: Paul G. Buxton, P. Eng. - Project Manager
Betty MacAlpine, Office Manager

Address: 305 Hwy. 303, Unit 3, Conway, B0V 1A0
PO Box 2113, Digby, B0V 1A0

Phone: (902) 245 2567 Fax: (902) 245 5614

NOTICE:

NEXT COMMUNITY LIAISON COMMITTEE MEETING:
JANUARY 30, 2003, 7:30 p.m.,
Rossway Community Hall. (Call 245-2567 to Add to the Agenda).

FOR YOUR INFORMATION

Facts Sheet
No. 2
February, 2003

WHITES COVE PROJECT

PERMIT FOR CONSTRUCTION AND OPERATION OF 4 HA. QUARRY:

The permit granted by the Province of Nova Scotia was issued pursuant to Part V of the *Environment Act, S.N.S., 1994-95, c1* and is subject to rigorous Terms and Conditions, which include, among others, issues relating to Construction and Setbacks, Noise, Dust, Blasting and Water Discharge.

DETAILS OF TERMS AND CONDITIONS

1) SURVEY AND SETBACKS

A survey must be submitted to the Nova Scotia Department of Environment and Labour (NSDOEL) showing the exact location, corners and boundaries of the active area, and all applicable separation distances for quarry operations which are:

i) 30m of the boundary of a public or common highway (unless consent is received from the Dept. of Transportation and Public Works).
ii) 30m of the bank of any watercourse or ordinary high water mark.
iii) 30m of the boundary of the quarry property.

EROSION AND SEDIMENTATION

Controls are to be in place prior to construction and these controls are to be maintained and to remain in place until the disturbed areas are stabilized.

SIGNAGE

Signage must include hours of operation, emergency/telephone numbers and contacts and must be posted at the entrance of the quarry.

2) DUST

The dust generated must be suppressed by the application of water sprays or other suitable, approved dust suppressants. Dust emissions monitoring must be conducted at the request of NSDOEL and the location of monitoring stations may include areas beyond the quarry.

3) SOUND LEVELS/NOISE

The sound levels measured at the site property boundaries cannot exceed stipulated Equivalent Sound Levels (Leq) and must be monitored (including areas beyond the quarry boundaries) at the request of NSDOEL.

i) DAYS (7:00 a.m.-7:00 p.m.) - Leq 65 dBA (Decibel)
ii) EVENINGS (7:00 p.m.-11:00p.m.) - Leq 60 dBA
iii) NIGHTS (11:00p.m.-7:00a.m.), ALL DAY SUNDAY, STATUTORY HOLIDAYS - Leq 55 dBA

Based on 'Equivalent Sound Level' research (available upon request), a level of 60 dBA is deemed equivalent to the sound of "conversational speech at 1 foot away".

4) BLASTING

The Permit stipulates:

i) ground vibration and air concussion limits. A technical blast design which ensures these limits must be reviewed by NSDOEL before any blasting takes place. Blasts must then be monitored to ensure the limits are not exceeded, and a monthly summary of results must be submitted to NSDOEL.
ii) water quality analysis of all structures within 800 metres of the quarry must be submitted before any blasting takes place
iii) marine mammals in the area - a report must be submitted to the Department of Fisheries and Oceans, Maritime Aquatic Species at Risk Office, verifying that the charge size and blast design will not have an adverse effect on marine mammals. This report must be accepted by DFO before blasting commences.

SETBACKS

Blasting is not permitted within:

i) 30m of the boundary of a public or common highway
ii) 30m of the bank of any watercourse or ordinary high water mark
iii) 800m of the foundation or base of a structure located off site

5) WATER DISCHARGE

SURFACE WATER

i) Siltation of the surface water is to be prevented by developing and maintaining the site based on the criteria set out by the NSDOEL, '*Erosion and Sedimentation Control Handbook for Construction Sites*'.
ii) Erosion and sedimentation control devices must be installed before any excavation of material.
iii) No surface water may be discharged beyond the quarry boundary without a current and valid authorization from the affected landowners.
iv) Liquid effluent levels must meet the limits stipulated in the Permit and effluent must also be monitored at the frequency and locations specified. A monthly summary of the monitoring results are to be submitted to NSDOEL.

GROUNDWATER

i) Any water supply which has been lost or damaged as a result of extracting material must be replaced at the Permit holder's expense.
ii) Any excavating below the watertable must be approved by NSDOEL.

ENVIRONMENTAL ASSESSMENT CRITERIA:

GREATER THAN 4H QUARRY

The Environmental Assessment process reviews the activities being carried out, and their possible effects on the environment of the area. Elements typically investigated include the, Flora/Fauna, Marine Mammals, Marine Ecology, Geology, Hydrogeology, Archeology and Cultural aspects. These assessments are conducted by independent professionals who must be "qualified personnel, in accordance with recognized industry standards and procedures". (A list of professionals retained is available upon request).

MARINE TERMINAL

As the product will be shipped from a constructed marine terminal, a Federal Environmental Assessment is required. The Assessment will again be carried out by independent professionals who will investigate possible effects on marine life. As the quarry and marine terminal are so closely linked, a joint Federal/Provincial Environmental submission will be filed combining the assessments of both the quarry and terminal.

Information and reports on the ongoing Federal/Provincial environmental assessment process will be available through the Community Liaison Committee.

ECONOMIC FACTS OF THE PROJECT:

CAPITAL COSTS

- Moving and crushing equipment, marine terminal and ship loader - in excess of $25 million.
- Moving equipment to be purchased in Nova Scotia
- Other equipment to be purchased in Canada

EMPLOYMENT

Construction of quarry and terminal to create work in local area for about one year.

- 31 full-time people required to operate quarry on year-round basis
- Additional employees required on an 'as needed' basis
- Competitive wages, training provided (List of job rates and application for employment available upon request)
- Preference in hiring given to people in local area

COMMUNITY LIAISON MEMBERS:

Cindy Nesbitt - Chair; Judith Cary, Brian Cullen, David Graham, Christine Harnish, John Ivens, Mark Jeffrey.

NOTICE:

NEXT COMMUNITY LIAISON COMMITTEE MEETING
February 27, 7:00 p.m. at Rossway Community Hall
To add to the agenda please contact Cindy Nesbitt.

CONTACTS:

Paul Buxton, P.Eng. - Project Manager
Betty MacAlpine - Office Manager
Global Quarry Products, 305 Hwy. 303, Unit 3, Conway, B0V 1A0
Office: (902) 245-2567 Fax: (902) 245 5614

FOR YOUR INFORMATION

Facts Sheet
No. 3
April, 2003

WHITES COVE PROJECT

COMMUNITY LIAISON COMMITTEE UPDATE

The Terms and Conditions of the Approval to Construct and Operate a less than 4Ha quarry stated that at the request of the NS Department of the Environment the Proponent shall establish a Community Liaison Committee. The NS Department of the Environment made such a request and the Committee was established to hold regular community meetings and inform the community about the Whites Cove project.

The first meeting was held on July 8, 2002 at the Sandy Cove Fire Hall. To date, CLC has met on a total of 9 occasions, the most recent on March 12 at the Rossway Community Hall.

Many aspects of the project are discussed at these meetings, however, certain questions have been asked on a number of occasions. Following are a number which generated the most interest:

FREQUENTLY ASKED QUESTIONS AT CLC MEETINGS

Q. Is the Proponent of the Whites Cove quarry planning other quarries on the Bay of Fundy or St. Mary's bay?

A. No. The Proponent of the Whites Cove quarry IS NOT planning any other quarrying activities on either the Bay of Fundy or St. Mary's Bay.

Q. Could other proponents apply for permits to operate quarries on the Bay of Fundy or St. Mary's Bay?

A. Yes, it's possible. A permit to construct and operate a less than 4 Ha quarry is relatively simple to obtain. However, there is not enough rock available for export from such an area to justify building a marine terminal which would cost approximately 15-20 million dollars. A very large quantity of rock would be required to justify the expense of its construction. A 4 Ha permit means there is only enough rock to supply the local market, and a review of markets in the local area (Digby and Annapolis Counties) shows that it is already being adequately supplied by existing quarries operating in the area.

To secure a Permit for a larger than 4 Ha quarry, and to construct such a quarry and marine terminal to ship the product requires a very large capital expenditure, and therefore, a guaranteed market for the entire production. Without a guaranteed market, no proponent would risk this very large capital expenditure. Global Quarry Products has a guaranteed market for its entire production.

Q. Is the Proponent of the Whites Cove Quarry required to restore the quarry site after quarrying operations have been terminated?

A. Yes. Under the Terms and Conditions of the 4 Ha permit, the Proponent was required to post a security suitable to the NS Department of Environment and Labour in the amount of $6,250 per hectare of disturbed area BEFORE disturbance, or before June 15, 2002. The Proponent posted a security of $25,000 in accordance with the stipulation.

The Proponent must also submit a rehabilitation plan to the NS Department of Environment and Labour before April 30, 2003. This plan must be revised and updated every 3 years and submitted to the NSDEL for review. In addition, before the expiry of the security currently in place, the Proponent must post a final security which is to be calculated using the rehabilitation plan and the costs to carry it out. This final security amount is to be revised every three years in accordance with revisions to the submitted rehabilitation plan.

The Proponent must rehabilitate the site within 12 months of abandoning the quarried site and it must be in accordance with the approved rehabilitation plan. The security deposit will not be released until the rehabilitation plan has been completed to the satisfaction of the Minister or Administrator of the NS Department of Environment and Labour.

FREQUENTLY ASKED QUESTIONS ...CONTINUED

Q. Have any cemeteries been found on the quarry site?
A. No. There is no physical evidence of cemeteries on the site nor is there any documented evidence of cemeteries ever being on the site.

Q. Will traditional activities such as periwinkle or dulse harvesting be prevented once the quarry is in operation?
A. No. Access to the beach will be provided and maintained for this traditional activity. A meeting is planned with periwinkle and dulse harvesters to delineate routes and access points.

Q. Will local labour be employed at the quarry site?
A. Yes. The Proponent has gone on record as stating that preference will be given to residents of Digby and Annapolis Counties in the hiring policy. As previously stated, the initial construction of the quarry and terminal will create work in the local area for about 1 year. In addition, competitive wages and training for the operation of the quarry will be provided for at least 31 full-time people. Additional employees will be hired on an 'as needed' basis.

Q. Will the work be year-round?
A. Quarrying and shipping operations may be expected to cease during the most severe winter conditions, however, maintenance work will be carried out during this period. In general, employees can expect to work for an average of 10 months per year.

Q. Will the quarry operate at night?
A. The present plan is for two 8-hour shifts operating between 6:00 a.m. and 10:00 p.m.

Q. How long will the quarry be in operation?
A. Given the quantity of rock available and the anticipated annual shipments the quarry expects to operate for over 40 years.

Q. When will work begin on the quarry site?
A. Work will commence in the Spring of 2003 but work on the Marine Terminal is not expected to begin until the early Spring of 2004.

Q. Can the quarry be seen from Highway #217?
A. No. No part of the quarry operation can be seen from Hwy. #217 or from anywhere on the Eastern side of the Neck.

Q. Will the quarry operation mean more truck traffic on Highway #217?
A. All crushed product will be shipped from the marine terminal. Only emergency supplies of crushed stone to the Department of Transportation and Public Works for use locally will be trucked. There will be some increase in general traffic from employees and delivery vehicles to the quarry, particularly during the construction.

COMMUNITY LIAISON MEMBERS:

Cindy Nesbitt - Chair; Judith Cary, Brian Cullen, David Graham, Christine Harnish, John Ivens, Mark Jeffrey.

NOTICE:

NEXT COMMUNITY LIAISON COMMITTEE MEETING
April 9, 7:00 P.M. Rossway Community Hall
(To add to the Agenda please contact Cindy Nesbitt)

CONTACTS:

Paul Buxton, P.Eng. - Project Manager
Betty MacAlpine - Office Manager
Global Quarry Products, 305 Hwy. 303, Unit 3, Conway, B0V 1A0
Office: (902) 245-2567 Fax: (902) 245 5614

Whites Cove Project

Global Quarry Products
Fact Sheet No. 4

October 2003

Community Liaison Committee

The Community Liaison Committee met at the Rossway Community Hall on Wednesday August 27th and October 8th. As many in the community have already discovered these meetings are open and the public is encouraged to attend. The minutes are available at the Global Quarry Office in Digby. Members of the Community Liaison Committee are:
Cindy Nesbitt-Chair
Judith Carty, Brian Cullen, David Graham, Christine Harnish, John Ivens, Mark Jefffrey.
The public is encouraged to convey their comments and concerns to any member of the Committee or to the Office of Global Quarry Products.

Canadian Environmental Assessment Review panel

On August 11th the public was invited to comment, on the draft agreement for the joint environmental assessment panel review process for the proposed Whites Point Quarry and Marine Terminal in Digby County. This document will detail the parameters for the environmental assessment and delineate the responsibilities of the various federal and provincial departments as well as the scope of the criteria for the review. Following the approval of the agreement the review process will commence with significant opportunities for public comment. The draft agreement can be reviewed at:
http://www.ceaa-acee.gc.ca/0009/0001/0001/0023/draft_e.htm
and comments can be sent to:

Chris Daly
Nova Scotia Environment and Labour
5151 Terminal Road, 5th Floor
P.O. Box 697
Halifax NS B3J 2T8
Tel.: (902) 424-2574
Fax: (902) 424-0503
E-mail: ea@gov.ns.ca

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Gatineau QC K1A 0H3
Tel.: (819) 997-2937
Fax: (819) 997-4931
E-mail: steve.chapman@ceaa-acee.gc.ca

Comments on the draft agreement must be received no later than October 22, 2003.

Employment

Employment opportunities with the fully operational Quarry have been distributed to the community liaison committee and have been available to the public through the minutes of these meetings. At this point in time it is projected that there will be 31 full time positions in two shifts. The hourly wage ranges from $14.00 o $20.00 per hour depending on the position. For more information please contact Ms. MacAlpine at the Global Quarry Products Office.

The Proponent's Buyer

The site in White's Cove is being developed by Global Quarry Products as a source of aggregate for Clayton Concrete of New Jersey. Basalt is one of the most desirable aggregates used in the manufacture of concrete. The benefits to the overall environment when this type of construction material is used are well documented.

Clayton Concrete was founded in 1951, and has stayed on the cutting edge of construction material technology. Although famous for concrete, the award winning Clayton Block Company, a sister company, is capable of producing over 360 different block shapes, designs and textures and has successfully worked with architects and contractors to design and manufacture custom block for specific projects. Newer block product additions are a lightweight block called C-Lite and Allan Block retaining wall systems. As a licensed manufacturer of Allan Block, which uses no mortar and is available in a variety of shapes and colors. Clayton Block has found unprecedented acceptance of this superior product by contractors, landscapers and homeowners. Clayton Block also offers customers a full line of specialty finish split face and ground face architectural block designs that have been selected for some of New Jersey's most beautiful buildings. In fact, in 1990 the company won a Grand Award for excellence in concept, design, originality and application of brick or block for the products supplied to the Princeton University Fischer Hall building from the New Jersey State Conference of Bricklayers and Allied Craftsmen and the Mason Contractors Association of New Jersey.

(From the Clayton Website
http:www.claytonco.com)

Why Concrete?

We are aware of the need to develop construction methods that are environmentally sound, yet are durable and sustainable. It has been determined that concrete is just such a product. Concrete itself provides a range of environmental benefits. Concrete's durability conserves resources by reducing maintenance and the need for reconstruction. The thermal mass of concrete buildings saves energy year-round; concrete structures cost less to cool in the summer and to heat in the winter than do wood or steel buildings. Concrete buildings are also better able to withstand fire, wind, or other natural disasters. At the end of its initial service life, concrete can be crushed and reused as an aggregate in new concrete, continuing the life cycle of environmental benefits.

Source Websites:

http://www.ecco.org/
http://cementamericas.com/ar/cement_cement_concrete_environment/

Global Quarry Products

Digby office
Unit #3 305 Highway # 303 in Conway
Office Manager -Betty MacAlpine
Project Manager- Paul Buxton, P.Eng
Phone: 902-245-2567

Whites Point Project

Issue #5 | November 30, 2004

Bilcon is the Sole Proponent

Bilcon of Nova Scotia is a wholly owned subsidiary of Clayton Concrete, Block & Sand of Lakewood, New Jersey. In Nova Scotia the Quarry Manager is John Wall, The Project Manager is Paul Buxton and Kristy Herron co-ordinates Communications.
The office is located in

Conway Place
305 Highway #303
Conway, NS
and our mailing address is
P. O. Box 2113
Digby, NS
B0V 1A0
902-245-2567 Office
902-245-5614 fax
Bilcon.NS@ns.aliantzinc.ca

Please do not hesitate to drop in during our regular office hours: 10am to 4pm, Monday through Friday.

Review Panel Members Appointed

(Excerpts from the CEAA press releases)

On November 5th The Honourable Stéphane Dion, Federal Minister of the Environment, and Hon. Kerry Morash, Nova Scotia Minister of Environment and Labour, jointly established a three-member panel to review Bilcon's proposed basalt quarry and a marine terminal at Whites Point, Digby County. The panel members are: Dr. Robert O. Fournier (Chair), Dr. Jill Grant, and Dr. Gunter Muecke.

Robert O. Fournier (Chair)

Dr. Fournier received a Ph.D. in Biological Oceanography from the University of Rhode Island in 1967. In 1971, he joined the teaching team of Dalhousie University in Halifax where he has been specializing in Oceanography.
Dr. Fournier has substantive experience with panel reviews. He chaired the National Energy Board – *Canadian Environmental Assessment Act (*CEAA) joint review panel for the Sable Gas Project (1996-1998). He also chaired the provincial Electricity Marketplace Governance Committee (2002-2003), co-chaired and facilitated the Provincial Energy Strategy Public Meetings (2001) and chaired the Halifax Cleanup Task Force (1989-1990).
Dr. Fournier is also very well known for his media activities, contributing science commentaries to media including national and local radio, television and magazines since 1974. He is the author or co-author of more than sixty documents on topics ranging from biological oceanography to energy, electricity and the economy.

Jill Grant

Dr. Grant received a Ph.D. in Regional Planning and Resource Development from the University of Waterloo in 1991. Dr. Grant pursued teaching at the Nova Scotia College of Art and Design as a professor in Environmental Planning (1988-2001) and has been a professor at Dalhousie University's School of Planning and a member of the Graduate Faculty since 2001.

Dr. Grant is a member of the Canadian Institute of Planners and served on the editorial board of Plan Canada which she chaired from 2001 to 2004. She has also been associated with numerous professional journals such as the Journal of the American Planning Association, the Landscape and Urban Planning Journal the Journal of Industrial Ecology and the Journal of Environmental Management.

Gunter Muecke

Dr. Muecke started his teaching and research career as a field geologist for Shell Canada (1960-1963) and then became a lecturer in Mineralogy at Oxford University (1968-1970). In 1969, he received a D.Phil. in Geochemistry from Oxford University. He then pursued a teaching career at Dalhousie University, in the Department of Geology and Earth Sciences (1970-1998) and at the School of Resource and Environmental Studies (1985-1998). Since 1998, he assumed post-retirement appointments as Associate Research professor both at the School of Resource and Environmental Studies and at the Faculty of Science (Geographic Information Systems).

Dr. Muecke has a long-standing interest and involvement in the geological aspects of environmental issues. He has knowledge and direct experience of both the federal and provincial environmental assessment processes having been an appointed member of the federal-provincial review panel for the Kelly's Mountain Coastal Superquarry Project (1991).

Further on November 10th the Canadian Environmental Assessment Agency and Nova Scotia Environment and Labour invited the public to comment on draft Guidelines for the preparation of the Environmental Impact Statement (EIS) for the Whites Point Project These guidelines will identify the issues that Bilcon of Nova Scotia will be required to address in its environmental assessment of the project and provide Bilcon with direction on how to describe and assess these issues, and how to structure the EIS that will be submitted to the joint review panel. After taking public comments into consideration, the joint review panel will finalize and issue the Guidelines to the proponent. **Written comments on the draft Guidelines must be received by the joint review panel no later than January 21, 2005.** Please forward your comments, in the official language of your choice, by mail e-mail to the following:

Steve Chapman, Panel ManagerWhites Point Quarry and Marine Terminal Project - Joint Review PanelPO Box 486 C.R.OHalifax NS B3J 2R7
E-mail: Comments@WPQ-JointReview.ca

The draft EIS Guidelines are available on the Web sites of the Canadian Environmental Assessment Agency (www.ceaa-acee.gc.ca) or Nova Scotia Environment and Labour (www.gov.ns.ca/enla/eis/ca). The joint review panel will soon release the procedures to be followed for the review and announce the dates for public meetings.

Copies of the draft EIS Guidelines can be reviewed at the following centres:

Canadian Environmental Assessment Agency
1801 Hollis St., Suite 200
Halifax, NS
Nova Scotia Environment and Labour
5151 Terminal Rd., 5th floor
Halifax, NS

Nova Scotia Environment and Labour
Yarmouth District Office
13 First St.
Yarmouth, NS

Annapolis Royal Branch Library
Town Hall
285 St. George St.

Annapolis Royal, NS

Isaiah W. Wilson Memorial Library
84 Warwick St.
Digby, NS

Clean Nova Scotia
126 Portland Street
Dartmouth, NS

Ecology Action Centre
Suite 31
1568 Argyle St.
Halifax, NS

Bilcon of NS
305 Highway #303
Suite #3
Conway, NS

Also announced by the Canadian Environmental Assessment Agency on November 10th was the establishment of a $100,000 Participant Funding Program to assist the public to take part in the joint panel review of the Whites Point Quarry and Marine Terminal project in Digby County. The total funding amount will be made available in two separate phases. Phase I: Up to $25,000 will be provided in participant funding to help individuals to take part in the review of the Environmental Impact Statement (EIS) Guidelines. The EIS Guidelines serve as a guide for the proponent in preparing a statement of the projected effects of the project on the environment. A funding review committee, independent of the joint review panel, will consider all applications and recommend allocation of funds to applicants according to the eligibility criteria set out in the *Participant Funding Program Guide*. Only expenditures incurred following the allocation of funding will be eligible. The allocation of federal funds will be made on the basis of applications received by the Agency **no later than December 10, 2004**. Successful applicants will be required to sign a contribution agreement with the Agency.

Phase II: Up to $75,000 will be available to the public to prepare for and take part in the panel hearings. Information regarding funding applications for Phase II will be announced at a later date. The *Participant Funding Program Guide,* the application form and information on the panel review process for the project are available on the Agency's Web site at
www.ceaa-acee.gc.ca .
For more information on the Participant Funding Program, or to submit an application, please contact:
Peter Bedrossian
Participant Funding Program
Canadian Environmental Assessment Agency
160 Elgin Street, 22nd Floor
Ottawa, ON K1A 0H3
Tel.: (613) 957-0254
E-mail: peter.bedrossian@ceaa-acee.gc.ca

To register as an interested party and to be kept informed of the panel's activities, please provide a full mailing address, an e-mail address and/or a fax number, as applicable, to the panel manager, Steve Chapman.

Bilcon Open House

On December 7th and 8th Bilcon will be hosting an informational Open House in the Conway Office. For information please contact Kris at 902-245-2567.

Tuesday December 7th
Noon to 4pm
Wednesday December 8th
10:00am to 8pm

Light Refreshments will be served

Whites Point Project

Issue #6 | April 15, 2005

Environmental Assessment Update

Bilcon Personnel attended all four of the Public Meetings held by the Panel to review the draft guidelines for the Environmental Impact Statement. These meetings were very informative and were extremely useful to the development of the Proposed Project.

On March 31st the Joint Panel released the final Environmental Impact Statement Guidelines for the Whites Point Project. These can be found on the CEAA website. **http://www.ceaa-acee.gc.ca/010/0001/0001/0023/index_e.htm**

The document is quite long and the criteria is very comprehensive. It is noteworthy that the Panel Members carefully reviewed the comments and suggestions by the pubic.

Bilcon is now in the process of assembling the response to this document. This will be the Environmental Impact Statement (EIS) that will be subject to further comment by the public and another round of hearings Conducted by the Panel. As the volume of completed research and ongoing studies is extensive this will take a significant period of time.

Volunteer Recognition

The Clayton Companies place a high value on Community contributions of both time and resources. As this issue of our Newsletter will be distributed during International Volunteer Recognition Month, Bilcon would like to add their appreciation of all those who give their time to benefit the people of their communities.

Bilcon is on the Web

Bilcon would like to invite you to visit their Internet web site at

www.bilconof.ns.ca

The site has current information on the Project and the Environmental Assessment Process. Also available is company information with contacts and links to Clayton Companies

Participant Funding Announced

The Canadian Environmental Assessment Agency announced on April 13th, the availability of Phase 2 of the Participant Funding Program to assist the public to take part in the joint panel review of the Whites Point Quarry and Marine Terminal project in Digby County.

Phase 2 participant funding of up to $81,300 is now available to help the public prepare for and participate in the review of the Environmental Impact Statement (EIS) and the panel hearings to follow. This amount combines the previously allotted $75,000 for Phase 2 and funds that were not distributed during Phase 1. A total funding amount of $100,000 was established to help the public participate in the environmental assessment process. Funding applications received at the Agency by May 11, 2005 will be considered. The funding review committee, independent of the review panel, considers all applications and recommends to the President of the Agency the distribution of available funds to successful applicants according to the eligibility criteria set out in the Participant Funding Program Guide.

The news release and the CEAA link can be accessed from the Bilcon website.

Reclamation Process

One of the most widespread concerns expressed by the general public is the status of the Whites Point site following termination of the quarrying and shipping operation. The Environmental Impact Statement will deal with this issue in detail but it is important to note the following:

1 The reclamation process must be approved by the Panel;

2 The costs of reclaiming the site will be established by government agencies and Bilcon will be required to provide funds for reclamation to the government prior to the construction of the quarry;

Bilcon intends to carry out reclamation on an incremental basis. When an area of the site has been quarried out, this area will be reclaimed as new areas are being opened up and quarried. This procedure means that only a fraction of the site is being worked at any one time while the balance will be unopened areas or areas already reclaimed.

The primary goal of reclamation is to return the land to beneficial use. Mined out aggregate pits and quarries are converted to second uses that include residential property, wildlife refuges, golf courses and gardens like the Butchart Gardens in Victoria.

The Bilcon office in Digby has illustrations of reclamations that have been carried out in the Province of Nova Scotia as well as graphic representation of the projected reclamation plan for Whites Point.

Bilcon Contacts

Office: 305 Highway #303 Conway
Hours: 10am - 4pm (M-F)
Mail: P. O. Box 2113
Digby, NS, B0V 1A0

Phone: 902-245-2567
Fax: 902-245-5614
E-mail Bilcon.NS@ns.aliantzinc.ca
Website www.Bilconof.ns.ca

Tourist Industry Consultation

On February 15th Bilcon held an informal information session from 7pm to 10pm for the tourism sector. Individual letters were sent to Operators of Accommodations, Restaurants and Adventure tourism businesses inviting them to share their concerns and to review the proposed project. Those who attended found this forum useful. There were many open and frank discussions associated with possible impacts. As part of the ongoing consultative process Bilcon will be inviting other sectors to participate in these types of forums.

DALA Career Fair

Bilcon was one of the many participants who had displays at the Career Fair sponsored by the Career Resource Centre of the Digby and Area Learning Association. Through the course of the two days, April 1st and 2nd , 213 individuals from the local area who were looking for employment opportunities and training options attended. Our display had information about the Project, and the potential employment positions at the quarry site.

Notes from Clayton Concrete

Bill Clayton Sr. and the Clayton Companies were recognized by the Sate of New Jersey in a Joint Legislative Resolution for their "**uncommon level of public-spiritedness in benefit of the community as evidenced through support of local school programs, colleges and Universities, various law enforcement and fire departments throughout the state, the Lakewood Blueclaws and their causes, the Boy and Girl Scouts, many churches and religious organizations and the annual National Night Out Against Crime program**"

BIRD SPECIES OF BRIER ISLAND

DATE(s)

WEATHER

OBSERVERS

R	Resident, occurring year-round.
M	Migrant, occurring in Spring and/or Fall.
N	Confirmed breeder.
(N)	Unconfirmed breeder.
(F)	Former breeder: Used to breed on Brier Island but hasn't for many years.
W	Winters.
S	Summer.
V	Visitor.
?	Single observer sighting.
E	Introduced species.

c	common:	Observed every year on Brier Island. Usually in good numbers.
u	uncommon:	Observed almost every year on Brier Island. Usually in low numbers.
i	irruptive:	Observed some years on Brier Island. My be in good numbers.
r	rare:	Observed some years on Brier Island. Usually in low numbers.
x	extirpated:	Used to be resident on Brier Island, but hasn't been seen for many years.
e	exceptional:	Number of sightings.
p		Breeds only on Peters Island.

Number of Species (July 2001) 336
(in addition, 5 species are single observer sightings)

Added in 2001: Mute Swan

Format for records:
e.g. NMc = Confirmed breeder/Common migrant; We = Winters/exceptional

LARKS
_____Horned Lark *Erenophila alpestris* – Wc, Mc

MARTINS AND SWALLOWS
_____Purple Martin *Progne subis*- Mr
_____Tree Swallow *Tachycineta bicolor*- Nc, Mc
_____Northern Rough-winged Swallow *Strelgidopteryx serripennis* – Mr
_____Bank Swallow *Riparia riparia* – Nc, Mc
_____Cliff Swallow *Petrochelidon pyrrhonota*- Nu, Mu
_____Barn Swallow *Hirundo rustica* – Nc, Mc

TITMICE
_____Black-capped Chickadee *Poecile atricapillus* – Nc, Mc
_____Boreal Chickadee *Pocile hudsonicus* – (N), Mc

NUTHATCHES
_____Red-breasted Nuthatch *Sitta canadensis* – Nc, Mc
_____White-breasted Nuthatch *Sitta carolinensis*- Mr

CREEPERS
_____Brown Creeper *Certhia Americana* – Mc

WRENS
_____House Wren *Troglodytes aedon* – Mu
_____Winter Wren *Troglodytes troglogytes*- (N), Mc
_____Sedge Wren *Cistothorus platensis* – Ve (2)
_____Marsh Wren *Cistothorus palustris* – Ve (4)

KINGLETS
_____Golden-crowned Kinglet *Regulus satrapa* – (N), Mc
_____Ruby-crowned Kinglet *Regulus calendula* – Mc

GNATCATCHERS
_____Blue-gray Gnatcatcher *Polioptila caerulea* – Mu

THRUSHES
_____Northern Wheatear *Oenanthe oenanthe* – Ve (2)
_____Eastern Bluebird *Sialia sialis*- Nu, Mu
_____Veery *Catharus fuscescens*- Mc
_____Gray-cheeked Thrush *Catharus minimus* – Mr
_____Bicknell's Thrush *Catharus bicknelli* – Ve (1)
_____Swainson's Thrush *Cahtarus ustulatus* – (N), Mc
_____Hermit Thrush *Catharus guttatus*- Nr, Mc
_____Wood Thrush *Hylocichla mustelina* – Mr
_____American Robin *Turdus migratorius* – Nc, Mc

STARLINGS
_____European Starling *Sturnus vulgaris* RNc

MIMICS
_____Gray Catbird *Dumetella carolinensis* – Nc, Mc
_____Northern Mockingbird *Mimus polyglottos*
_____Brown Thrasher *toxostoma rufum* – We, Mu

PIPITS
_____American Pipit *Anthus rebescens* – Wc, Mc

WAXWINGS
_____Bohemian Waxwing *Bombycilla garrulous* – Ve (3)
_____Cedar Waxwing *Bombycilla cedrorum* – Nc, Mc

WARBLERS
_____Blue-winged Warbler *Vermivora pinus* – Mr
_____Golden-winged Warbler *Vermivora chrysoptera* – Mr
_____Tennessee Warbler *Vermivora peregrina* – Mu
_____Orange-crowned Warbler *Vermivora celata* – Mu
_____Nashville Warbler *Vermivora ruficapilla* - Mc
_____Northern Parula *Parula Americana* – Nu, Mc
_____Yellow Warbler *Dendroica petechia* – Nc, Mc
_____Chestnut-sided Warbler *Dendroica pensylvanica* – Mc
_____Magnolia Warbler *Dendroica magnolia* – Nu, Mc
_____Cape May Warbler *Dendroica tigrina* – Mc
_____Black-throated Blue Warbler – *Dendroica caerulenscens* – Mc
_____Yellow-rumped Warbler *Dendroica coronata* – Nc, Mc
_____Black throated Gray Warbler *Dendroica nigrescens* – Vc (1)
_____Black-throated Green Warbler *Dendroica verens* – Nc, Mc
_____Blackburnian Warbler *Dendroica fusca* – Mc
_____Yellow-Throated Warbler *Dendroica dominica* – Ve (4)
_____Pine Warbler *Dendroica pinus* – Mr
_____Prairie Warbler *Dendroica discolor* – Mu
_____Palm Warbler *Dendroica palmarum* – Mc
_____Bay-breasted Warbler *Dendroica castanea* – Mc
_____Blackpoll Warbler *Dendroica striata* – Nc, Mc
_____Cerulean Warbler *Dendroica cerulea* - Ve (2)
_____Black-and-white Warbler *Mniotilta varia* – Nc, mc
_____American Redstart *Setophaga rutrillo* – Nu, Mc
_____Prothonotaria Warbler *Protonetaria citren* – Ve (2)
_____Worm-eating Warbler *Helmitheros vermivorus* - Ve (2)
_____Ovenbird *Seiurus aurocapillus* – Mc
_____Northern Waterthrush *Seiurus noveboracensis* – Mc
_____Louisiana Waterthrush *Seiurus motacilla* – Ve (2)
_____Kentucky Warbler *Oporonis formosus* – Ve (2)
_____Connecticut Warbler *Oporonis agilis* - V2 (2)
_____Mourning Warbler *Oporonis philadelphia* - V2 (2)
_____Common Yellowthroat *Geothlypis trichas* – Nc, Mc
_____Hooded Warbler *Wilsonia citrina* - Ve (4)

_____Wilson's Warbler *Wilsonia pusilla* – Mc
_____Canada Warbler *Wilsonia canadensis* – Nr, Mc
_____Yellow-breasted Chat – *Icteria virens* – Mi

TANAGERS
_____Summer Tanager *Piranga rubra*- Mr
_____Scarlet Tanager *Piranga olivacea* – Mu
_____Western Tanager *Piranga tudoviciana* – Ve (2)

SPARROWS AND ALLIES
_____Eastern Towhee *Pipilo erythrophtalmus* – We, Mr
_____American Tree Sparrow *Spizella arborea* – Wc, Mc
_____Chipping Sparrow *Spizella passerine* – Nc, Mc
_____Clay-colored Sparrow *Spizella pallida* – Mr
_____Field Sparrow *Spizella pusilla* – Mr
_____Vesper Sparrow *Pooecetes gramineus* – Mu
_____Lark Sparrow *Chondestes grammacus* – Mu
_____Sage Sparrow *Amphispiza belli* Ve (1)
_____Lark Bunting *Calamospiza melanocorys* – Ve (4)
_____Savannah Sparrow *Passerculus sandwichensis* – Nc, Mc
_____Grasshopper Sparrow *Ammodramus savannarum* – Ve (3)
_____Nelson's Sharp-tailed Sparrow *ammodramus nelsoni* – (N), Mc
_____Seaside Sparrow *Ammodramus maritimus* – Ve (1)
_____Fox Sparrow *Passerella iliaca* – Mc
_____Song Sparrow *Melospiza melodia* – Nc, RMc
_____Lincoln's Sparrow *Melospiza lincolnii* – Mc
_____Swamp Sparrow *Melospiza geogriana*- Nu, Mc
_____White-throated Sparrow *Zontrichia albicollis*- Nc, Mc
_____White-crowned Sparrow *Zonotrichia leucophrys* - Mc
_____Dark-eyed Junco *Junco hyematis* – (N), Mc
_____Lapland Longspur *Calcarius lapponicus* – Mc
_____Snow Bunting *Plectrophenax nivalis* – Wc, Mc

CARDINALS AND ALLIES
_____Northern Cardinal *Cardinalis cardinalis*- Mu
_____Rose-breasted Grosbeak *Pheucticus ludovicianus* – Mc
_____Blue Grosbeak *Guiraca caerulea* – Mr
_____Indigo Bunting *Passerina cyanea* – Ne, Mi
_____Dickcissel *Spiza americana* – Mu

BLACKBIRDS AND ALLIES
_____Bobolink *Dolichonyx oryzivorus* – Nu, Mc
_____Red-winged Blackbird *Agelaius phoeniceus* – Nc, Mc
_____Eastern Meadowlark *Sturnella magna*- Mu
_____Yellow-headed Blackbird *Xanthocephalus xanthocephalus* – Ve(6)
_____Rusty Blackbird *Euphagus carolinus* – Mc
_____Brewer's Blackbird *Euphagus cyanocephalus* – Ve (2)
_____Common Grackle *Quiscalus quiscula* – Nc, Mc
_____Brown-headed Cowbird *Molothrus ater* – Nc, Mu
_____Orchard Oriole *Icterus spurius* – Mu

LOONS
_____Red-throated Loon *Gavia stellata* – Wc, Mc
_____Pacific Loon *Gavia pacifica* - ?
_____Common Loon *Gavia immer* – Wc, Mc
\
GREBES
_____Pied-billed Grebe *Podilymbus podiceps* – Mr
_____Horned Grebe *Podiceps auritus* – Wc
_____ Red-necked Grebe *Podiceps grisegeno* - Mc, Wc

FULMARS AND SHEARWATERS
_____ Northern Fulmar *fulmarus glacialis* – Mu, Wc
_____Cory's Shearwater *Calonectris diomedea* – Ve (4)
_____Greater Shearwater *Puffinus gravis* – Mc
_____Manx Shearwater *Puffinus puffinus* – Mu, Su

STORM-PETREL
_____Wilson's Storm-Petrel *Oceanites oceanicus* – Mc
_____Leach's Storm-Petrel *Oceanodroma leucorhoa* – (F) Sc, Mc

TROPICBIRDS
_____White-tailed Tropicbird *Phaethon lepturus* – Ve (5)

GANNETS
_____ Northern Gannet *Murus bassanus* – Su, Mc, Wu

PELICANS
_____Brown Pelican *Pelecamus occidentalis* – V (2)

CORMORANTS
_____Double-crested Cormorant *Phalacrocorax auritus* – Nc, Wr
_____Great Cormorant *Phalacrocorax carbo* – Rc

BITTERNS AND HERONS
_____American Bittern *Botaurus lentiginosus* – Mr, We (1)
_____Least Bittern *Ixobrychus exilis* – Ve (1)
_____Great Blue Heron *Ardea herodias* – Nu, Mc
_____Great Egret *Ardea alba* Vr
_____Snowy Egret *Egretta thula* – Vr
_____Little Blue Herron *Egretta caerudea* – Vr
_____Tricolored Heron *Egretta tricolor* – Ve (1)
_____Cattle Egret *Bubulcus ibis* – Vr
_____Green Heron *Butorides virescens* – Sr, Mu
_____Black-crowned Night-Heron *Nycticorax nycticorax* – Mu
_____Yellow-crowned Night-Heron *Nyctanassa violacea* – Mr

IBISES
_____Glossy Ibis *Plegadis falcinellus* – Ve (1)

VULTURES
_____Turkey Vulture *Cathartes aura* – Rc

WHISTLING- DUCKS, GEESE, SWANS AND DUCKS
_____Fulvous Whistling-Duck *Dendrocygna bicolor* - ?
_____Greater White-fronted Goose *Anser albifrons* – Ve (1)
_____Snow Goose *Chen raerulescens* – Mi
_____Canada Goose *Branta canadensis* – Ne (1), Mc
_____Brant *Braua bernicla* – Wu, Mc
_____Mute Swan *Cygnus olor* – Ee (1)
_____Tundra Swan *Cygnus columbianus* – Vr
_____Wood Duck *Aix sponsa* – Sr, Mr
_____Gadwall *Anas Strepera* – Mu
_____American Wigeon *Anas americana* – Mu
_____American Black Duck *Anas rubripes* – Nc, R
_____Mallard *Anas platyrhynchos* – Nc, Wr
_____Blue-Winged Teal *Anas discors* – Nu, Mc
_____Northern Shoveler *Anas clypeata* – Mu
_____Northern Pintail – *Anas acuta*- Mu
_____Green-winged Teal *Anas crecca* – Nc, Wr
_____Redhead *Aythya americana* – Ve (2)
_____Ring-necked Duck *Aythya collaris* – Mu
_____Tufted Duck *Aythya fuligula* – Ve (1)
_____Greater Scaup *Aythya marila* – Mc
_____Lesser Scaup *Aythya affinis* – Mu
_____King Eider *Somateria spectablis* – Sr, Mr
_____Common Eider *Somateria mollissima* – Nc, R
_____Harlequin Duck *Histrionicus histrionicus* – Mu
_____Surf Scoter *Melanitta perspicittata* – Mc
_____White-winged Scoter *Melanitta fusca* – Mc
_____Black Scoter *Melanitta nigra* – Mc
_____Long-tailed Duck *Clangula hyemalis* – Mc
_____Bufflehead *Bucephala albeola* – Mu
_____Common Goldeneye *Bucephala clangula* – Mc
_____Barrow's Goldeneye *Bucephala islandica* – Ve (3)
_____Hooded Merganser *Lophodytes cucullatus* – Mc, We (1)

_____Common Merganser *Mergus merganser* – Nr. Wc
_____Ruddy Duck *Oxyura jamaicensis* – Ve (2)

OSPREY
_____Osprey *Pandion haliaetus* – Mc

KITES, HAWKS AND EAGLES
_____Mississippi Kite *Ictinia mississippiensis* – Ve (4)
_____Bald Eagle *Haliaeetus leucocephalus* – Mc
_____Northern Harrier *Circus cyaneus* – Nc, Mu
_____Sharp-shinned Hawk *Accipiter striatus* – Nu, Mc
_____Cooper's Hawk *Accipiter cooperii* – Mr
_____Northern Groshawk *Accipiter gentiles* – Nr, Mu
_____Red-shouldered Hawk *Buteo lineatus* – Mu
_____Swainson's Hawk *Buteo swainsoni* – Ve (2)
_____Red-tailed Hawk *Buteo jamaicensis* – Mc
_____Rough-legged Hawk *Buteo lagopus* – Mc, Wu
_____Golden Eagle *Aquila chrysaetos* – Mr

FALCONS
_____ American Kestrel *Falco sparverius* – Mc
_____Merlin *Falco columbarius* – Mc
_____Gyrafalcon *Falco rusticolus* – We (4)
_____Peregrine Falcon *Falco peregrinus* – Mc

PARTRIDGE, PHEASANTS AND GROUSE
_____Gray Partridge *Perdix perdix* – E (1)
_____Ring-Necked Pheasant – *Phasianus colchicus* –Nc, E
_____Ruffed Grouse *Bonasa umbellus* – Nc, R
_____Spruce Grouse *Falcipennis canadensis* – (f), Ve

RAILS, GALLINULES AND COOTS
_____Clapper Rail *Rallus longirostris* – Ve (2)
_____Virginia Rail *Rallus limicola* – Mr
_____Sora *Porzana Carolina* – Mr
_____American Coot – *Fulica americana* – Ve (1)

LIMPKIN
_____Limpkin *Aramus guarauna* - Ve (1)

CRANES
_____Sandhill Crane *Grus canadensis* – Ve (1)

PLOVERS
_____Black-bellied Plover *Pluvialis squatarola* – Mc
_____American Golden-Plover *Pluvialis dominica* – Mu
_____Wilson's Plover *Charadrius wilsonia* – Ve (1)
_____Semipalmated Plover *Charadrius semipalmarus*- Mc
_____Piping Plover *Charadrius melodus* – Mu
_____Killdeer *Charadrius voriderus* – Nu, Mc

SANDPIPERS AND PHALAROPES
_____Greater Yellowlegs *Tringa melanoleuca* – Mc
_____Lesser Yellowlegs *Tringa flavipes* – Mc
_____Solitary Sandpiper *Tringa solitaria* – Mr
_____Willet *Catoptrophorus semipalmatus* – Mc
_____Spotted Sandpiper *Actitis macularia* – Nc, Mc
_____Upland Sandpiper *Bartramia longicauda* – Mr
_____Whimbrel *Numentius phaeopus* – Mc
_____Hudsonian Godwit *Limosa haemastica* – Mu
_____Ruddy Turnstone *Arenaria interpres* – Mc
_____Red Knot *Calidris canutus* – Mu
_____Sanderling *Calidris alba* – Mc
_____Semipalmated Sandpiper *Calidris pusilla* – Mc
_____Western Sandpiper *Calidris mauri* – Mr
_____Little Stint *Caladris Minuta* – Ve (1)
_____Least Sandpiper *Caladris minutilla* – Mc
_____White-rumped Sandpiper *Caladris fuscicallis* – Mc
_____Baird's Sandpiper *Caladris bairdii* – Mu
_____Pectoral Sandpiper *Caladris melanotos* – Mu
_____Purple Sandpiper *Caladris maritime* – We
_____Dunlin *Caladris alpina* – Mc
_____Curlew Sandpiper *Caladris ferruginea* – Ve (1)
_____Stilt Sandpiper *Caladris himanthopus* – Mr
_____Buff-breasted Sandpiper *Tryngites subruficollis* – Mr
_____Ruff *Philomachus pugnax* – Ve (3)
_____Short-billed Dowitcher *Limnodromus griseus* – Mc
_____Long-billed Dowitcher *Limnodromus scolopaceus* – Ve (3)
_____Common Snipe *Gallinago gallinago* – Mc
_____American Woodcock *Scolopax minor* – Nu, Mu
_____Wilson's Phalarope *Phalaropus tricolor* – Mr
_____Red-necked Phalarope *Phalaropus lobatus* – Mc
_____Red Phalarope *Phalaropus fulicaria* – Mc

SKUAS, GULLS, TERNS AND SKIMMER
_____Great Skua *Catharacia skua* – Ve (2)
_____South Polar Skua *Catharacia maccormicki* – Mu
_____Pomarine Jaeger *Stercorarius pomarinus* – Mc
_____Parasitic Jaeger *Stercorarius parasiticus* – Mc
_____Long-tailed Jaeger *Stercorarius longicaudus* – Ve (2)
_____Laughing Gull *Larus atricilla* – (N) pe (1), Mu
_____Franklin's Gull *Larus pipixcan* – Ve (1)
_____Black-headed Gull *Larus ridibundus* – Mu
_____Bonaparte's Gull *Larus piladelphia* – Mu
_____Mew Gull *Larus canus* – Ve (2)
_____Ring-billed Gull *Larus delawarensis* – Mu
_____Herring Gull *Larus argentatus* – Nc, R
_____Iceland Gull *Larus glaucoides* – Wc
_____Lesser Black-backed Gull *Larus marinus* – Nc, R
_____Sabine's Gull *Xema sabini* – Ve (2)
_____Caspian Tern *Sterna caspia* – Ve (4)
_____Royal Tern *Sterna maxima* – Ve (3)
_____Sandwich Tern *Sterna sandvicensis* – Ve (1)
_____Roseate Tern *Sterna dougallii* – Npr, S
_____Common Tern *Sterna hirundo* – Npc, S
_____Arctic Tern *Sterna paradisaea* – Npc, S
_____Forster's Tern *Sterna forsteri* – Ve (1)
_____Least Tern *Sterna antillarum* - ?
_____Black Tern *Chlidonias niger* – Mr
_____Black Skimmer *Rynchops niger* – Ve (1)

AUKS, MURRES AND PUFFINS
_____Dovekie *Alle alle* – Wc
_____Common Murre *Uria aalge* – Wu
_____Thick-billed Murre *Uria lomvia* – Wc
_____Razorbill *Alca torda* – Wc
_____Black Guillenot *Cepplus grille* (N), Mc, Wc
_____Atlantic Puffin *Fratercula arctica* – Mc

DOVES
_____Rock Dove *Columbia livia* – Nc, R
_____White-winged Dove *Zenaida asiatica* – Ve (1)
_____Mourning Dove *Zenaida maccroura* – Nc, R

CUCKOOS
_____Black-billed Cuckoo *Coccyzus erthropthalmus* – Mr
_____Yellow-billed Cuckoo *coccyzus americanus* – Mr

OWLS
_____Great Horned Owl *Bubo virginianus* – Nc, R
_____Snowy Owl *Nyctea scandiaca* – Wu
_____Northern Hawk Owl *Surnia ulutu* – Ve (3)
_____Barred Owl *Strix varia* – Mr
_____Long-eared Owl *Asio otus* – Mu
_____Short-eared Owl *Asia flammeus* – Mu
_____Boreal Owl *Aegolius fumerius* – Ve (1)
_____Northern Saw-whet Owl *Aegolius acadicus* – (N), Mc

GOATSUCKERS
_____Common Nighthawk *Babo virginianus* – Nc, R
_____Chuck-will's -widow *Caprimulgus carolinensis* – Ve(1)
_____Whip-poor-will *Caprimulgus vociferus* - Mu

SWIFTS
_____Chimney Swift *Chaetura pelagica* – Mc

HUMMINGBIRDS
_____Ruby-throated Hummingbird – *Architoclus colubris* – Mc

KINGFISHERS
_____Belted Kingfisher *Ceryle alcyon* – Nc, Mc

WOODPECKERS
_____Red-headed Woodpecker *Melanerpes erthrocephalus* – Mr
_____Red-belllied Woodpecker *Melanerpes carolinus* – Ve (2)
_____Yellow-bellied Sapsucker *Sphyrapicus varius* – Mu
_____Downy Woodpecker *Picoides pubescens* – Mu
_____Hairy Woodpecker *Picoides villosus* – Mu
_____Three-toed Woodpecker *Picoides tridactylus* - ?
_____Black-backed Woodpecker *Picoides arcticus* – Mr
_____Northern Flicker *Colapies auratus* – Nc, Mc
_____Pileated Woodpecker *Dryocopus pileatus* - ?

FLYCATCHERS AND KINGBIRDS
_____Olive-sided Flycatcher *Contopus cooperi* – Mu
_____Eastern Wood-Pewee *Contropus virens* – Mc
_____Yellow-bellied Flycatcher *Empidonax flaviventris* –Mc
_____Acadian Flycatcher *Empidonal virescens* Ve (3)
_____Alder Flycatcher *Empidonax almorum* – Nc, Mc
_____Least Flycatcher *Empidomax minimus* – Mc
_____Eastern Phoebe *Sayornis phoebe* – Mc
_____Say's Phoebe *Sayornis saya* – Ve (2)
_____Great Crested Flycatcher *Myiarchus crinitus* – Mu
_____Western Kingbird *Tyrannus verticalis* – Mu
_____Eastern Kingbird *Tyrannus tyrannus* – Mc

SHRIKES
_____Loggerhead Shrike *Lantius ludovicianus* – Ve (5)
_____Northern Shrike *Lantius excubitor* – Wc

VIREOS
_____White-eyed Vireo *Vireo griseus*- Mr
_____Yellow-throated Vireo *Vireo flavifrons* –Mr
_____Blue-headed Vireo *Vireo solitarius* – Mc
_____Warbling Vireo *Vireo Gilvus*- Mr
_____Philadelphia Vireo *Vireo philadelphieus* – Mu
_____Red-eyed Vireo *Vireo olivaceus* – Mc

CORVIDS
_____Gray Jay *Perisoreus canadensis* – Ne, Vr
_____Blue Jay *Cyanocritta cristola* – Nu, RMc
_____Black-billed Magpie *Pica pica* – Ve (1)
_____Eurasian Jackdaw *Corvus monedula* – Ve (1)
_____American Crow *Corvus brachyrhynchos* – RNc
_____Common Raven *Corvus corax*- RNc
_____Baltimore Oriole *Icterus galbula* – (N), Mc

FINCHES
_____ Pine Grosbeak *Pinicola enucleator* – Wi
_____Purple Finch *Carpodacus purpureus* – Nu, Mc
_____House Finch *Carpodocus mixicamus* – (N), Me
_____Red Crossbill *Loxia eurvirostra* – Mu
_____White-winged Crossbill *Loxia leucoptera* – Mc
_____Common Redpoll *Carduelis flamurea* – Wc, Mu
_____Hoary Redpoll *Carduelis hornemanni* – Ve (1)
_____Pine Siskin *Carduelis pinus* –Wi, Mu
_____American Goldfinch *Carduelis tristis* – Nc, Mc
_____Evening Grosbeak *Coccothraustes vespertimus* – Nc, R

OLD WORLD SPARROWS
_____House Sparrow *Passer domesticus* – Nc, R

List compiled by: Lance Laviolette – November 4th, 2002
Assisted by: Ian A. McLaren
Eric L. Mills
Richard Sterns

BIRD SPECIES OF BRIER ISLAND

DATE(s) _____

WEATHER _____

OBSERVERS _____

_____

_____

_____

R - Resident, occurring year round.
M - Migrant, occurring in Spring and/or Fall.
N - Confirmed breeder.
(N) - Unconfirmed breeder.
(F) - Former breeder: Used to breed on Brier Island but hasn't for many years.
W - Winters.
S - Summer.
V - Visitor.
? - Single observer sighting.
E - Introduced species.

c - common: Observed every year on Brier Island. Usually in good numbers.
u - uncommon: Observed almost every year on Brier Island. Usually in low numbers.
i - irruptive: Observed some years on Brier Island. May be in good numbers.
r - rare: Observed some years on Brier Island. Usually in low numbers.
x - extirpated: Use to be resident on Brier Island but hasn't been seen for many years.
e - exceptional (number of sightings).
p - breeds only on Peters Island.

Number of Species (Nov. 2005): 338
(in addition, 5 species are single observer sightings)

Format for records:
e.g. NMc = Confirmed breeder/Common migrant; We = Winters/exceptional

LOONS
____**Red-throated Loon** *Gavia stellata* - Wc, Mc
____**Pacific Loon** *Gavia pacifica* - ?
____**Common Loon** *Gavia immer* - Wc, Mc

GREBES
____**Pied-billed Grebe** *Podilymbus podiceps* - Mr
____**Horned Grebe** *Podiceps auritus* - Wc
____**Red-necked Grebe** *Podiceps grisegena* - Mc, Wc

FULMARS AND SHEARWATERS
____**Northern Fulmar** *Fulmarus glacialis* - Mu, Wc
____**Cory's Shearwater** *Calonectris diomedea* - Ve(4)
____**Greater Shearwater** *Puffinus gravis* - Mc
____**Sooty Shearwater** *Puffinus griseus* - Mc
____**Manx Shearwater** *Puffinus puffinus* - Mu, Su

STORM-PETRELS
____**Wilson's Storm-Petrel** *Oceanites oceanicus* - Mc
____**Leach's Storm-Petrel** *Oceanodroma leucorhoa* - (F)Sc, Mc

TROPICBIRDS
____**White-tailed Tropicbird** *Phaethon lepturus* - Ve(5)

GANNETS
____**Northern Gannet** *Morus bassanus* - Su, Mc, Wu

PELICANS
____**Brown Pelican** *Pelecanus occidentalis* - V(2)

CORMORANTS
____**Double-crested Cormorant** *Phalacrocorax auritus* - Nc, Wr
____**Great Cormorant** *Phalacrocorax carbo* - Rc

BITTERNS AND HERONS
____**American Bittern** *Botaurus lentiginosus* - Mr, We(1)
____**Least Bittern** *Ixobrychus exilis* - Ve(1)
____**Great Blue Heron** *Ardea herodias* - Nu, Mc
____**Great Egret** *Ardea alba* - Vr
____**Snowy Egret** *Egretta thula* - Vr
____**Little Blue Heron** *Egretta caerulea* - Vr
____**Tricolored Heron** *Egretta tricolor* - Ve(1)
____**Cattle Egret** *Bubulcus ibis* - Vr
____**Green Heron** *Butorides virescens* - Sr, Mu
____**Black-crowned Night-Heron** *Nycticorax nycticorax* - Mu
____**Yellow-crowned Night-Heron** *Nyctanassa violacea* - Mr

IBISES
____**White Ibis** *Eudocimus albus* - Ve(1)
____**Glossy Ibis** *Plegadis falcinellus* - Ve(1)

VULTURES
____**Turkey Vulture** *Cathartes aura* - Rc

WHISTLING-DUCKS, GEESE, SWANS, AND DUCKS
____**Fulvous Whistling-Duck** *Dendrocygna bicolor* - ?
____**Greater White-fronted Goose** *Anser albifrons* - Ve(1)
____**Snow Goose** *Chen caerulescens* - Mi
____**Canada Goose** *Branta canadensis* - Ne(1), Mc
____**Brant** *Branta bernicla* - Wu, Mc
____**Mute Swan** *Cygnus olor* - Ee(1)
____**Tundra Swan** *Cygnus columbianus* - Vr
____**Wood Duck** *Aix sponsa* - Sr, Mr
____**Gadwall** *Anas strepera* - Mu
____**American Wigeon** *Anas americana* - Mu
____**American Black Duck** *Anas rubripes* - Nc, R
____**Mallard** *Anas platyrhynchos* - Nc, Wr
____**Blue-winged Teal** *Anas discors* - Nu, Mc
____**Northern Shoveler** *Anas clypeata* - Mu
____**Northern Pintail** *Anas acuta* - Mu
____**Green-winged Teal** *Anas crecca* - Nc, Wr
____**Redhead** *Aythya americana* - Ve(2)
____**Ring-necked Duck** *Aythya collaris* - Mu
____**Tufted Duck** *Aythya fuligula* - Ve(1)
____**Greater Scaup** *Aythya marila* - Mc
____**Lesser Scaup** *Aythya affinis* - Mu
____**King Eider** *Somateria spectabilis* - Sr, Mr
____**Common Eider** *Somateria mollissima* - Nc, R
____**Harlequin Duck** *Histrionicus histrionicus* - Mu
____**Surf Scoter** *Melanitta perspicillata* - Mc
____**White-winged Scoter** *Melanitta fusca* - Mc
____**Black Scoter** *Melanitta nigra* - Mc
____**Long-tailed Duck** *Clangula hyemalis* - Mc
____**Bufflehead** *Bucephala albeola* - Mu
____**Common Goldeneye** *Bucephala clangula* - Mc
____**Barrow's Goldeneye** *Bucephala islandica* - Ve(3)
____**Hooded Merganser** *Lophodytes cucullatus* - Mc, We(1)
____**Common Merganser** *Mergus merganser* - Mc
____**Red-breasted Merganser** *Mergus serrator* - Nr, Wc
____**Ruddy Duck** *Oxyura jamaicensis* - Ve(2)

OSPREY
____**Osprey** *Pandion haliaetus* - Mc

KITES, HAWKS, AND EAGLES
____**Mississippi Kite** *Ictinia mississippiensis* - Ve(4)
____**Bald Eagle** *Haliaeetus leucocephalus* - Mc
____**Northern Harrier** *Circus cyaneus* - Nc, Mu
____**Sharp-shinned Hawk** *Accipiter striatus* - Nu, Mc
____**Cooper's Hawk** *Accipiter cooperii* - Mr
____**Northern Goshawk** *Accipiter gentilis* - Nr, Mu
____**Red-shouldered Hawk** *Buteo lineatus* - Mu
____**Broad-winged Hawk** *Buteo platypterus* - Ne, Mc
____**Swainson's Hawk** *Buteo swainsoni* - Ve(3)
____**Red-tailed Hawk** *Buteo jamaicensis* - Mc
____**Rough-legged Hawk** *Buteo lagopus* - Mc, Wu
____**Golden Eagle** *Aquila chrysaetos* - Mr

FALCONS
____**American Kestrel** *Falco sparverius* - Mc
____**Merlin** *Falco columbarius* - Mc
____**Gyrfalcon** *Falco rusticolus* - We(5)
____**Peregrine Falcon** *Falco peregrinus* - Mc

PARTRIDGE, PHEASANTS, AND GROUSE
____**Gray Partridge** *Perdix perdix* - E(1)
____**Ring-necked Pheasant** *Phasianus colchicus* - Nc, E
____**Ruffed Grouse** *Bonasa umbellus* - Nc, R
____**Spruce Grouse** *Falcipennis canadensis* - (F), Ve

RAILS, GALLINULES, AND COOTS
____**Clapper Rail** *Rallus longirostris* - Ve(2)
____**Virginia Rail** *Rallus limicola* - Mr
____**Sora** *Porzana carolina* - Mr
____**Common Moorhen** *Gallinula chloropus* - Mr
____**American Coot** *Fulica americana* - Ve(1)

LIMPKIN
____**Limpkin** *Aramus guarauna* - Ve(1)

CRANES
____**Sandhill Crane** *Grus canadensis* - Ve(2)

PLOVERS
____**Black-bellied Plover** *Pluvialis squatarola* - Mc
____**American Golden-Plover** *Pluvialis dominica* - Mu
____**Wilson's Plover** *Charadrius wilsonia* - Ve(1)
____**Semipalmated Plover** *Charadrius semipalmatus* - Mc
____**Piping Plover** *Charadrius melodus* - Mu
____**Killdeer** *Charadrius vociferus* - Nu, Mc

SANDPIPERS AND PHALAROPES
____**Greater Yellowlegs** *Tringa melanoleuca* - Mc
____**Lesser Yellowlegs** *Tringa flavipes* - Mc
____**Solitary Sandpiper** *Tringa solitaria* - Mr
____**Willet** *Catoptrophorus semipalmatus* - Mc
____**Spotted Sandpiper** *Actitis macularia* - Nc, Mc
____**Upland Sandpiper** *Bartramia longicauda* - Mr
____**Whimbrel** *Numenius phaeopus* - Mc
____**Hudsonian Godwit** *Limosa haemastica* - Mu
____**Ruddy Turnstone** *Arenaria interpres* - Mc
____**Red Knot** *Calidris canutus* - Mu
____**Sanderling** *Calidris alba* - Mc
____**Semipalmated Sandpiper** *Calidris pusilla* - Mc
____**Western Sandpiper** *Calidris mauri* - Mr
____**Little Stint** *Calidris minuta* - Ve(1)
____**Least Sandpiper** *Calidris minutilla* - Mc
____**White-rumped Sandpiper** *Calidris fuscicollis* - Mc
____**Baird's Sandpiper** *Calidris bairdii* - Mu
____**Pectoral Sandpiper** *Calidris melanotos* - Mu
____**Purple Sandpiper** *Calidris maritima* - Wc
____**Dunlin** *Calidris alpina* - Mc
____**Curlew Sandpiper** *Calidris ferruginea* - Ve(1)
____**Stilt Sandpiper** *Calidris himantopus* - Mr
____**Buff-breasted Sandpiper** *Tryngites subruficollis* - Mr
____**Ruff** *Philomachus pugnax* - Ve(3)
____**Short-billed Dowitcher** *Limnodromus griseus* - Mc
____**Long-billed Dowitcher** *Limnodromus scolopaceus* - Ve(3)
____**Wilson's Snipe** *Gallinago delicata* - Mc
____**American Woodcock** *Scolopax minor* - Nu, Mu
____**Wilson's Phalarope** *Phalaropus tricolor* - Mr
____**Red-necked Phalarope** *Phalaropus lobatus* - Mc
____**Red Phalarope** *Phalaropus fulicaria* - Mc

SKUAS, GULLS, TERNS, AND SKIMMERS
____**Great Skua** *Catharacta skua* - Ve(2)
____**South Polar Skua** *Catharacta maccormicki* - Mu
____**Pomarine Jaeger** *Stercorarius pomarinus* - Mc
____**Parasitic Jaeger** *Stercorarius parasiticus* - Mc
____**Long-tailed Jaeger** *Stercorarius longicaudus* - Ve(2)
____**Laughing Gull** *Larus atricilla* - (N)pe(1), Mu
____**Franklin's Gull** *Larus pipixcan* - Ve(2)
____**Black-headed Gull** *Larus ridibundus* - Mu
____**Bonaparte's Gull** *Larus philadelphia* - Mu
____**Mew Gull** *Larus canus* - Ve(3)
____**Ring-billed Gull** *Larus delawarensis* - Mu
____**Herring Gull** *Larus argentatus* - Nc, R
____**Thayer's Gull** *Larus thayeri* - Ve(2)
____**Iceland Gull** *Larus glaucoides* - Wc
____**Lesser Black-backed Gull** *Larus fuscus* - Ve(2)
____**Glaucous Gull** *Larus hyperboreus* - Wu
____**Great Black-backed Gull** *Larus marinus* - Nc, R
____**Black-legged Kittiwake** *Rissa tridactyla* - Mc, Wc
____**Sabine's Gull** *Xema sabini* - Ve(2)
____**Caspian Tern** *Sterna caspia* - Ve(4)
____**Royal Tern** *Sterna maxima* - Ve(3)
____**Sandwich Tern** *Sterna sandvicensis* - Ve(1)
____**Roseate Tern** *Sterna dougallii* - Npr, S
____**Common Tern** *Sterna hirundo* - Npc, S
____**Arctic Tern** *Sterna paradisaea* - Npc, S
____**Forster's Tern** *Sterna forsteri* - Ve(1)
____**Least Tern** *Sterna antillarum* - ?
____**Black Tern** *Chlidonias niger* - Mr
____**Black Skimmer** *Rynchops niger* - Ve(2)

AUKS, MURRES, AND PUFFINS
____**Dovekie** *Alle alle* - Wc
____**Common Murre** *Uria aalge* - Wu
____**Thick-billed Murre** *Uria lomvia* - Wc
____**Razorbill** *Alca torda* - Wc
____**Black Guillemot** *Cepphus grylle* - (N), Mc, Wc
____**Atlantic Puffin** *Fratercula arctica* - Mc

DOVES
____**Rock Pigeon** *Columba livia* - Nc, R
____**White-winged Dove** *Zenaida asiatica* - Ve(1)
____**Mourning Dove** *Zenaida macroura* - Nc, R

CUCKOOS
____**Black-billed Cuckoo** *Coccyzus erythropthalmus* - Mr
____**Yellow-billed Cuckoo** *Coccyzus americanus* - Mr

OWLS
____**Great Horned Owl** *Bubo virginianus* - Nc, R
____**Snowy Owl** *Bubo scandiaca* - Wu
____**Northern Hawk Owl** *Surnia ulula* - Ve(3)
____**Barred Owl** *Strix varia* - Mr
____**Long-eared Owl** *Asio otus* - Mu
____**Short-eared Owl** *Asio flammeus* - Mu
____**Boreal Owl** *Aegolius funereus* - Ve(1)
____**Northern Saw-whet Owl** *Aegolius acadicus* - (N), Mc

GOATSUCKERS
____**Common Nighthawk** *Chordeiles minor* - Mu
____**Chuck-will's-widow** *Caprimulgus carolinensis* - Ve(1)
____**Whip-poor-will** *Caprimulgus vociferus* - Mu

SWIFTS
____**Chimney Swift** *Chaetura pelagica* - Mc

HUMMINGBIRDS
____**Ruby-throated Hummingbird** *Archilochus colubris* - Mc

KINGFISHERS
____**Belted Kingfisher** *Ceryle alcyon* - Nc, Mc

WOODPECKERS
____**Red-headed Woodpecker** *Melanerpes erythrocephalus* - Mr
____**Red-bellied Woodpecker** *Melanerpes carolinus* - Ve(2)
____**Yellow-bellied Sapsucker** *Sphyrapicus varius* - Mu
____**Downy Woodpecker** *Picoides pubescens* - Mu
____**Hairy Woodpecker** *Picoides villosus* - Mu
____**American Three-toed Woodpecker** *Picoides dorsalis* - ?
____**Black-backed Woodpecker** *Picoides arcticus* - Mr
____**Northern Flicker** *Colaptes auratus* - Nc, Mc
____**Pileated Woodpecker** *Dryocopus pileatus* - ?

FLYCATCHERS AND KINGBIRDS
____**Olive-sided Flycatcher** *Contopus cooperi* - Mu
____**Eastern Wood-Pewee** *Contopus virens* - Mc
____**Yellow-bellied Flycatcher** *Empidonax flaviventris* - Mc
____**Acadian Flycatcher** *Empidonax virescens* - Ve(3)
____**Alder Flycatcher** *Empidonax alnorum* - Nc, Mc

____**Least Flycatcher** *Empidonax minimus* - Mc
____**Eastern Phoebe** *Sayornis phoebe* - Mc
____**Say's Phoebe** *Sayornis saya* - Ve(2)
____**Great Crested Flycatcher** *Myiarchus crinitus* - Mu
____**Western Kingbird** *Tyrannus verticalis* - Mu
____**Eastern Kingbird** *Tyrannus tyrannus* - Mc
____**Scissor-tailed Flycatcher** *Tyrannus forficatus* -Ve(1)

SHRIKES
____**Loggerhead Shrike** *Lanius ludovicianus* - Ve(5)
____**Northern Shrike** *Lanius excubitor* - Wc

VIREOS
____**White-eyed Vireo** *Vireo griseus* - Mr
____**Yellow-throated Vireo** *Vireo flavifrons* - Mr
____**Blue-headed Vireo** *Vireo solitarius* - Mc
____**Warbling Vireo** *Vireo gilvus* - Mr
____**Philadelphia Vireo** *Vireo philadelphicus* - Mu
____**Red-eyed Vireo** *Vireo olivaceus* - Mc

CORVIDS
____**Gray Jay** *Perisoreus canadensis* - Ne, Vr
____**Blue Jay** *Cyanocitta cristata* - Nu , RMc
____**Black-billed Magpie** *Pica pica* - Ve(1)
____**Eurasian Jackdaw** *Corvus monedula* - Ve(1)
____**American Crow** *Corvus brachyrhynchos* - RNc
____**Common Raven** *Corvus corax* - RNc

LARKS
____**Horned Lark** *Eremophila alpestris* - Wc, Mc

MARTINS AND SWALLOWS
____**Purple Martin** *Progne subis* - Mr
____**Tree Swallow** *Tachycineta bicolor* - Nc, Mc
____**Northern Rough-winged Swallow** *Stelgidopteryx serripennis* - Mr
____**Bank Swallow** *Riparia riparia* - Nc, Mc
____**Cliff Swallow** *Petrochelidon pyrrhonota* - Nu, Mu
____**Barn Swallow** *Hirundo rustica* - Nc, Mc

TITMICE
____**Black-capped Chickadee** *Poecile atricapillus* - Nc, Mc
____**Boreal Chickadee** *Poecile hudsonicus* - (N), Mc

NUTHATCHES
____**Red-breasted Nuthatch** *Sitta canadensis* - Nc, Mc
____**White-breasted Nuthatch** *Sitta carolinensis* - Mr

CREEPERS
____**Brown Creeper** *Certhia americana* - Mc

WRENS
____**House Wren** *Troglodytes aedon* - Mu
____**Winter Wren** *Troglodytes troglodytes* - (N), Mc
____**Sedge Wren** *Cistothorus platensis* - Ve(2)
____**Marsh Wren** *Cistothorus palustris* - Ve(4)

KINGLETS
____**Golden-crowned Kinglet** *Regulus satrapa* - Nc, Mc
____**Ruby-crowned Kinglet** *Regulus calendula* - Mc

GNATCATCHERS
____**Blue-gray Gnatcatcher** *Polioptila caerulea* - Mu

THRUSHES
____**Northern Wheatear** *Oenanthe oenanthe* - Ve(2)
____**Eastern Bluebird** *Sialia sialis* - Nu, Mu
____**Veery** *Catharus fuscescens* - Mc
____**Gray-cheeked Thrush** *Catharus minimus* - Mr
____**Bicknell's Thrush** *Catharus bicknelli* - Ve(1)
____**Swainson's Thrush** *Catharus ustulatus* - (N), Mc
____**Hermit Thrush** *Catharus guttatus* - Nr, Mc
____**Wood Thrush** *Hylocichla mustelina* - Mr
____**American Robin** *Turdus migratorius* - Nc, Mc

STARLINGS
____**European Starling** *Sturnus vulgaris* - Nc, R

MIMICS
____**Gray Catbird** *Dumetella carolinensis* - Nc, Mc
____**Northern Mockingbird** *Mimus polyglottos* - Ne, Mu
____**Brown Thrasher** *Toxostoma rufum* - We, Mu

PIPITS
____**American Pipit** *Anthus rubescens* - Wc, Mc

WAXWINGS
____**Bohemian Waxwing** *Bombycilla garrulus* - Ve(3)
____**Cedar Waxwing** *Bombycilla cedrorum* - Nc, Mc

WARBLERS
____**Blue-winged Warbler** *Vermivora pinus* - Mr
____**Golden-winged Warbler** *Vermivora chrysoptera* - Mr
____**Tennessee Warbler** *Vermivora peregrina* - Mu
____**Orange-crowned Warbler** *Vermivora celata* - Mu
____**Nashville Warbler** *Vermivora ruficapilla* - Mc
____**Northern Parula** *Parula americana* - Nu, Mc
____**Yellow Warbler** *Dendroica petechia* - Nc, Mc
____**Chestnut-sided Warbler** *Dendroica pensylvanica* - Mc
____**Magnolia Warbler** *Dendroica magnolia* - Nu, Mc
____**Cape May Warbler** *Dendroica tigrina* - Mc
____**Black-throated Blue Warbler** *Dendroica caerulescens* - Mc
____**Yellow-rumped Warbler** *Dendroica coronata* - Nc, Mc
____**Black-throated Gray Warbler** *Dendroica nigrescens* - Ve(1)
____**Black-throated Green Warbler** *Dendroica virens* - Nc, Mc
____**Blackburnian Warbler** *Dendroica fusca* - Mc
____**Yellow-throated Warbler** *Dendroica dominica* - Ve(5)
____**Pine Warbler** *Dendroica pinus* - Mr
____**Prairie Warbler** *Dendroica discolor* - Mu
____**Palm Warbler** *Dendroica palmarum* - Mc
____**Bay-breasted Warbler** *Dendroica castanea* - Mc
____**Blackpoll Warbler** *Dendroica striata* - Nc, Mc
____**Cerulean Warbler** *Dendroica cerulea* - Ve(2)
____**Black-and-white Warbler** *Mniotilta varia* - Nc, Mc
____**American Redstart** *Setophaga ruticilla* - Nu, Mc
____**Prothonotary Warbler** *Protonotaria citrea* - Ve(2)
____**Worm-eating Warbler** *Helmitheros vermivorus* - Ve(2)
____**Ovenbird** *Seiurus aurocapillus* - Mc
____**Northern Waterthrush** *Seiurus noveboracensis* - Mc
____**Louisiana Waterthrush** *Seiurus motacilla* - Ve(2)
____**Kentucky Warbler** *Oporornis formosus* - Ve(2)
____**Connecticut Warbler** *Oporornis agilis* - Ve(2)
____**Mourning Warbler** *Oporornis philadelphia* - Mc
____**Common Yellowthroat** *Geothlypis trichas* - Nc, Mc
____**Hooded Warbler** *Wilsonia citrina* - Ve(4)
____**Wilson's Warbler** *Wilsonia pusilla* - Mc
____**Canada Warbler** *Wilsonia canadensis* - Nr, Mc
____**Yellow-breasted Chat** *Icteria virens* - Mi

TANAGERS
____**Summer Tanager** *Piranga rubra* - Mr
____**Scarlet Tanager** *Piranga olivacea* - Mu
____**Western Tanager** *Piranga ludoviciana* - Ve(2)

SPARROWS AND ALLIES
____**Eastern Towhee** *Pipilo erythrophthalmus* - We, Mr
____**American Tree Sparrow** *Spizella arborea* - Wc, Mc
____**Chipping Sparrow** *Spizella passerina* - Nc, Mc
____**Clay-colored Sparrow** *Spizella pallida* - Mr
____**Field Sparrow** *Spizella pusilla* - Mr
____**Vesper Sparrow** *Pooecetes gramineus* - Mu
____**Lark Sparrow** *Chondestes grammacus* - Mr
____**Sage Sparrow** *Amphispiza belli* - Ve(1)
____**Lark Bunting** *Calamospiza melanocorys* - Ve(4)
____**Savannah Sparrow** *Passerculus sandwichensis* - Nc, Mc
____**Grasshopper Sparrow** *Ammodramus savannarum* - Ve(3)
____**Nelson's Sharp-tailed Sparrow** *Ammodramus nelsoni* - (N), Me
____**Seaside Sparrow** *Ammodramus maritimus* - Ve(1)
____**Fox Sparrow** *Passerella iliaca* - Mc
____**Song Sparrow** *Melospiza melodia* - Nc, RMc
____**Lincoln's Sparrow** *Melospiza lincolnii* - Mc
____**Swamp Sparrow** *Melospiza georgiana* - Nu, Mc
____**White-throated Sparrow** *Zonotrichia albicollis* - Nc, Mc
____**White-crowned Sparrow** *Zonotrichia leucophrys* - Mc
____**Dark-eyed Junco** *Junco hyemalis* - Nc, Mc
____**Lapland Longspur** *Calcarius lapponicus* - Mc
____**Snow Bunting** *Plectrophenax nivalis* - Wc, Mc

CARDINALS AND ALLIES
____**Northern Cardinal** *Cardinalis cardinalis* - Ne(1), Mu
____**Rose-breasted Grosbeak** *Pheucticus ludovicianus* - Mc
____**Blue Grosbeak** *Guiraca caerulea* - Mr
____**Indigo Bunting** *Passerina cyanea* - Ne, Mi
____**Dickcissel** *Spiza americana* - Mu

BLACKBIRDS AND ALLIES
____**Bobolink** *Dolichonyx oryzivorus* - Nu, Mc
____**Red-winged Blackbird** *Agelaius phoeniceus* - Nc, Mc
____**Eastern Meadowlark** *Sturnella magna* - Mu
____**Yellow-headed Blackbird** *Xanthocephalus xanthocephalus* - Ve(6)
____**Rusty Blackbird** *Euphagus carolinus* - Mc
____**Brewer's Blackbird** *Euphagus cyanocephalus* - Ve(2)
____**Common Grackle** *Quiscalus quiscula* - Nc, Mc
____**Brown-headed Cowbird** *Molothrus ater* - Nc, Mu
____**Orchard Oriole** *Icterus spurius* - Mu
____**Baltimore Oriole** *Icterus galbula* - (N), Mc

FINCHES
____**Pine Grosbeak** *Pinicola enucleator* - Wi
____**Purple Finch** *Carpodacus purpureus* - Nu, Mc
____**House Finch** *Carpodacus mexicanus* - (N), Me
____**Red Crossbill** *Loxia curvirostra* - Mu
____**White-winged Crossbill** *Loxia leucoptera* - Mc
____**Common Redpoll** *Carduelis flammea* - Wc, Mu
____**Hoary Redpoll** *Carduelis hornemanni* - Ve(1)
____**Pine Siskin** *Carduelis pinus* - Wi, Mu
____**American Goldfinch** *Carduelis tristis* - Nc, Mc
____**Evening Grosbeak** *Coccothraustes vespertinus* - Wi, Mr

OLD WORLD SPARROWS
____**House Sparrow** *Passer domesticus* - Nc, R

COMMENTS

Compiled by: Lance Laviolette – November 2, 2005
Assisted by: Ian A. McLaren, Eric L. Mills, Richard Stern

Whites Point Quarry – Blasting Protocol

Bilcon of Nova Scotia Corporation

May 2005 (revised)

1. Blasting will be conducted at the Whites Point Quarry as part of the construction and quarrying operations in accordance with the *Fisheries Act,* the *Nova Scotia Environment Act* and *Occupational Health and Safety Act,* and all regulatory requirements contained in the permit. The following procedures and practices will be adhered to:

…No blasting will be conducted in freshwater or marine fish habitat during construction or operation.

…On-land blasting will be conducted using the "Nova Scotia Department of Environment and Labour's "Pit & Quarry Guidelines" – 1999 and the Department of Fisheries and Oceans "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters" – 1998.

…On-land blasting will not be conducted below the 5 meter elevation above mean sea level.

…The frequency of blasting during quarry start-up will be once per week and once every two weeks during full production.

…Weekly production is proposed to be 40,000 tons.

…Explosives to be used will be ANFO (ammonium nitrate-fuel oil) based.

…ANFO will not be used in or near water.

…No storage of explosive materials will be done on-site.

…All explosives hauling, loading, and blasting will be conducted by a certified contractor.

…All blast designs will be prepared by a qualified blaster with a minimum of Class 2 certification for the Province of Nova Scotia.

…All blasted rock will be recovered for further processing.

2. Bilcon of Nova Scotia Corporation will follow the guideline criteria/thresholds as established by the Nova Scotia Department of the Environment's "Pit & Quarry Guidelines" rev. May 1999 and as outlined in paragraph VIII Blasting.

All blasting on-site shall be within the following guideline criteria/threshold limits.

Concussion (Air Blast) 128 dBA within 7 meters of the nearest structure not located on the property where the blasting operations occur, or other locations as directed by the Minister or Administrator.

Ground Vibration: 0.5 in./sec. (12.5 mm/s) Peak Particle Velocity measured below grade or less than 1 meter above grade in any part of the nearest structure not located on the property where blasting occurs, or other locations as directed by the Minister or Administrator.

Also, Bilcon of Nova Scotia Corporation shall conduct the following.

…Monitor all blasts for the parameters outlined above (concussion and ground vibration). See Map 001 for monitoring locations.

…Forward monitoring results to the Nova Scotia Department of Environment and Labour on a monthly basis unless otherwise indicated.

…No blasting shall occur on Sunday, on a statutory holiday prescribed by the Province, or on any day between the hours of 1800 hours and 0800 hours.

…Have a technical blast design prepared by a qualified person which ensures the ground vibration and air concussion as outlined above can be achieved.

…Conduct a pre-blast survey of all structures within 800 meters of the point of blast. This survey will be conducted in accordance with the Nova Scotia Department of Environment and Labour's "Procedure for Conducting a Pre-Blast Survey" November 1993.

…No blasting is to take place if a thermal inversion is anticipated at the time of the proposed blast.

3. Bilcon of Nova Scotia Corporation will follow the guideline criteria/thresholds as established by the Department of Fisheries and Oceans "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters" 1998.

All blasting on-site shall be within the following guideline criteria/threshold limits thereby intending to prevent or avoid destruction of fish, or any potentially harmful effect to fish habitat that could result from the use of explosives.

Overpressure – 100 kPa – No explosive is to be detonated in or near fish habitat that produces, or is likely to produce, an instantaneous pressure change (i.e. overpressure) greater than 100 kPa (14.5 psi) in the swim bladder of a fish.

Peak Particle Velocity – 13 mm/s - No explosive is to be detonated that produces, or is likely to produce, a peak particle velocity greater than 13 mm/s in a spawning bed during the period of egg incubation.

Modeling of shock wave propagation from the "initial blast" site to the marine water column was conducted by JASCO Research Limited – see Hannay, David E. M.Sc. and Thomson, Denis M.Sc. "Peak Pressure and Ground Vibration Study for Whites Cove Quarry Blasting Plan". August 2003. Site specific topography, bedrock composition and bathymetry were used to illustrate a "worst case" situation for quarry blasting in relation to the marine water column. Also, a proposed blast design including the weight and type of explosive, shot pattern and spacing, shot hole depth and diameter and delay sequence was included. The blast effects model CONWEP (Hyde 1992) was then run to predict the shape of the shock wave pressure at various distances from the detonation site. Results of the model indicate approximately 180 dB re 1 μPa in the water column at a distance of 500 meters from the detonation site.

To validate the above model results, an "initial blast" is proposed. Monitoring of the actual blast effects in the nearshore waters will be conducted for this "initial blast".

Marine Mammals – 500 meters – No explosive is to be knowingly detonated within 500 meters of any marine mammal (or no visual contact from an observer using 7 x 50 power pedestal mounted binocular).

Also, Bilcon of Nova Scotia Corporation shall conduct the following in accordance with the Draft DFO Expert Opinion "Potential Harmful Effects – Whites Point Quarry Blasting Protocol" May 4, 2005.

…Monitor in marine waters, an "initial blast" for the parameters outlined above (overpressure and peak particle velocity). See Map 001 for monitoring locations. In addition to the monitoring locations indicated on Map 001, under water blast sound levels will be monitored at the margin of the North Atlantic right whale conservation area (core area) during the "initial blast". Underwater monitoring will be conducted at approximately midpoint in the water column.

…Establish ambient underwater sound levels prior to the "initial blast", and monitor underwater vessel noise levels at the points shown on Map 001.

…Conduct the "initial blast" during December through May when the endangered North Atlantic right whales and Blue whales are not expected to be present.

…Employ a trained observer equipped with 7 x 50 power pedestal mounted binoculars to ensure no explosive is detonated within 500 meters of any marine mammal. See Map 001 for marine mammal observation area.

…Employ a trained observer to ensure no explosive is detonated within 2,500 meters of any endangered marine mammal.

…Visually monitor the behaviour of the seal colony at Crowells Cove during the "initial blast".

…Take water samples monthly in the area of active blasting at the nearest outfall into marine waters and analyze for ammonia (as N) in mg/L @0.05 EQL.

It should be noted that the monitoring stations and the marine mammal observation area shown on Map 001 are for the "initial blast" The location of the "initial blast" constitutes a "worst case" scenario of blasting in relation to the marine environment at the Whites Point Quarry. The location of monitoring stations and the area of marine mammal observation will change over time as areas of detonation move during quarry operation.

In instances where an impact is not likely to result in a harmful alteration, disruption or destruction of habitat, but there remains uncertainty as to the effectiveness of mitigation measures to prevent the alteration or disruption, Bilcon of Nova Scotia Corporation will develop adaptive management practices, in consultation with the regulatory authority, to ensure guideline/threshold criteria are met. Also, if any existing guideline/threshold criteria become obsolete based on more recent scientific information, Bilcon of Nova Scotia Corporation will develop adaptive management practices in consultation with the regulatory authority to address the particular situation.

IBoF Atlantic salmon - In May 2001, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designated the inner Bay of Fundy salmon (iBoF), *Salmo salar*, as endangered. Even though tag return data indicates that migrating iBoF salmon do not pass along the coast of Digby Neck in the area of the proposed Whites Point Quarry, their range during migration does extend into this portion of the Bay of Fundy. Since iBoF salmon is a species at risk, a precautionary approach is being proposed concerning possible adverse effects from blasting during quarry operations.

As stated previously, blasting will be conducted in accordance with the guideline criteria set forth in the "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters". As a further precautionary measure, and based on recommendations by the Department of Fisheries and Oceans – Habitat Management Division in their November 12, 2004 letter RE: Whites Point Quarry and Marine Terminal –Blasting Activity, "a horizontal distance from shoreline to the blast location be at least triple that determined by application of the equations" in the "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters". Also, the size of individual charges will be minimized and decked as required to further reduce effects. Decking would follow the procedure described in Department of Fisheries and Oceans – Newfoundland Region, Factsheet: "Blasting – Fish and Fish Habitat Protection", 1999.

Monitoring of the "initial blast" is proposed. The "initial blast" would consist of a decked, 45 kg charge of ANFO per hole with a 25 millisecond delay between charges. A minimum horizontal setback of 100 meters from the shoreline to the blast location as

recommended, is also proposed. Monitoring of the "initial blast" event would be conducted at three selected locations within nearshore marine waters. Again, the "initial blast" would be conducted during December through May when the endangered iBoF salmon are not expected to be present in nearshore waters.

Upon review of the monitoring results with the Department of Fisheries and Oceans – Habitat Management Division, threshold criteria would be established for subsequent blasting at the Whites Point Quarry. This threshold would then be used as a precautionary/mitigation measure during the July to October time period when iBoF salmon may migrate in this area of the Bay of Fundy.

Fisheries and Oceans Canada | Pêches et Océans Canada

Environmental Assessment and Major
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Dartmouth, NS
B2Y 4A2

Your file *Votre référence*

Our file *Notre réference*

03-FCR-020

February 10, 2006

Mr. Paul G. Buxton, Project Manager
Bilcon of Nova Scotia
P.O. Box 2113
Digby, N.S.
B0V 1A0

Dear Mr. Buxton:

RE: Whites Point Quarry and Marine Terminal Proposed Blasting Protocol

The Department of Fisheries and Oceans (DFO) has reviewed your Blasting Protocol dated May 2005 (attached). It is understood that this preliminary information was provided for review by DFO for the preparation of Bilcon's Environmental Impact Statement (EIS) to be submitted to the joint review panel. Based on this preliminary information, DFO is able to provide the attached opinion compiled from relevant expertise within DFO.

As you are aware, an environmental assessment under the *Canadian Environmental Assessment Act* (*CEAA*) is required once the need for a *Fisheries Act* Subsection 35(2) authorization was identified. The Whites Point Quarry and Marine Terminal project is subject to a Joint Panel Review under *CEAA* and the *Nova Scotia Environment Act*. The attached information is solely based on the Blasting Protocol provided and does not preclude DFO from providing additional comments on the EIS or any other information during the joint panel review process.

.../2

Please call me at (902) 426-9898 if you have any questions.

Sincerely,

ORIGINAL SIGNED BY

Mark McLean
Senior Environmental Analyst

Cc. P. Zamora, DFO
T. Worcester, DFO
H. MacPhail, NSEL
D. McDonald, CEAA
M. Freeman, TC

Fisheries and Oceans Canada Comments on the Whites Point Quarry and Marine Terminal Blasting Protocol

Introduction

A Blasting Protocol was submitted by Bilcon of Nova Scotia to Fisheries and Oceans Canada (DFO) - Habitat Management Division (HMD) on February 6, 2005 and updated in May 2005 (attached). This information, along with the original Whites Point Quarry Blasting Plan (2002) and the report titled "Peak Pressure and Ground Vibration Study for White's Cove Quarry Blasting Plan" (Hannay and Thomson 2003), was provided to DFO for review and comment for the proponent's preparation of the Environmental Impact Statement to be submitted to the Joint Review Panel formed under the *Canadian Environmental Assessment Act* and the *Nova Scotia Environment Act*.

It is understood that the following comments are based on the information submitted by Bilcon of Nova Scotia Corporation (including information submitted under the name Nova Stone Exporters Incoroporated). The review of the Blasting Protocol represents only a preliminary examination of part of the proposed undertaking and does not preclude further examination and commentary by DFO during the joint panel review. DFO's position and opinions are therefore subject to change depending on the information provided during the Joint Panel Review.

The analysis of the Blasting Protocol has been divided into two sections. The first is an analysis of the potential impacts of blasting on fish species, particularly the inner Bay of Fundy Atlantic Salmon population. The second section is an analysis of the potential impact of blasting on marine mammals. In obtaining this advice, DFO's Habitat Management Division (HMD) solicited information from various experts within DFO. However, any questions regarding the information should be addressed directly to DFO-HMD, Maritimes Region.

Fish Species

The Proponent has provided information related to concerns raised by DFO with respect to inner Bay of Fundy (iBoF) Atlantic salmon; a Schedule 1 listed endangered species under the *Species at Risk Act* (SARA). By committing to a horizontal distance from shoreline to the blast location which is at least triple that determined by the application of the equations in the "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters" (three times the guideline horizontal distance is approximately 100 metres), and by minimizing and decking the individual charges, any harm to iBoF Atlantic salmon and other species such as herring is likely to be avoided. As a precaution, the Proponent should supply calculations that predict the overpressures (at the locations salmon are likely to be) that will result from an "initial blast" described in the Proponent's Blasting Protocol. If an initial blast is to proceed, the calculations would be reviewed by DFO and, if required, the "initial blast" will be performed outside of the period when iBoF Atlantic salmon could be present. Monitoring of an "initial blast" using the above criteria (i.e. horizontal setback distances and decking of charges etc.) as outlined in the Proponent's Blasting Protocol, would be done and the results compared to the predicted results.

An adaptive management strategy could be developed in consultation with DFO if the project is permitted to proceed.

The proponent has indicated the blasting would not be undertaken on a continuous basis. In the early stages of development of the quarry, blasting would be once a week and during full production, blasting would occur once every two weeks. This could assist in the timing of any blasting to accommodate the passage of fish and marine mammals past the quarry site. The company would limit ground vibration to 12.5 mm/sec to limit damage to any nearby structures. This figure compares to DFO's peak pressure velocity guideline of 13 mm/sec for protection of spawning areas. The monitoring, suggested in the Proponent's Blasting Protocol, with monitoring stations identified on map 001, may be adequate from DFOs perspective to ensure compliance to this guideline.

Marine Mammals

For the provision of advice to Bilcon of Nova Scotia on their Blasting Protocol and in order to be prepared for inquires which may arise during the panel review, HMD requested a DFO Science review of the potential harmful effects of onshore blasting at Whites Point Quarry on marine mammals, and advice on mitigation and monitoring. In particular the following questions were presented for a DFO Science review by HMD:

- What is the potential for harmful effects on marine mammals beyond a 500m distance from the blasting site resulting from the sounds of blasting proposed for Whites Point Quarry?

- What is the potential for physical effects on endangered marine mammals beyond a 2500m distance from the blasting site resulting from the sounds of blasting proposed for Whites Point Quarry?

- What is the potential for behavioural effects on endangered marine mammals beyond a 2500m distance from the blasting site resulting from the sound of blasting proposed for Whites Point Quarry?

- How would mitigation activities currently proposed to be conducted in association with the blasting operations change the potential for impact on marine mammals?

- What monitoring could be conducted to validate the results of this assessment?

Issue

Construction of Whites Point Quarry and Marine Terminal (location map provided in Appendix A) would require in-ground blasting within close proximity to the Bay of Fundy shoreline. Whites Point lies approximately 22 km from the center of the Grand Manan Basin summer/fall congregation area of the endangered North Atlantic right whale. The presence of a protected area for endangered marine mammal species within a few miles of the site requires special consideration. A colony of harbour seals at Crowell's Cove has been known to haul out at a site

within 3 km of the proposed blast site. Other marine mammals are also expected to be present within close proximity to the proposed blasting site.

The proponent has proposed use of a 500 m safety radius from the detonation area (Bilcon of Nova Scotia Corporation, 2005), which would be monitored for marine mammals by experienced observers from shore-based sites. Blasting would not knowingly occur if marine mammals were seen to be present within this zone. A trained observer would also be employed to ensure no explosive was detonated within 2,500 m of an endangered marine mammal, such as a North Atlantic right whale (Bilcon of Nova Scotia Corporation, 2005). Advice is being sought on the potential effectiveness of these mitigation measures.

Assessment

Assessment Framework

The questions posed by Habitat Management Division will be answered in the context of an assessment framework developed specifically for this purpose.

Approach

Assessment of the risk of noise to the marine environment can be conducted using a source-pathway-receptor approach. For a risk of impact to exist, there must be a plausible relationship between the source, which in this case is the explosive charges; the pathway, i.e. the mechanism by which the source and receptor come in contact; and the receptor, which in this case would be the marine mammals likely present in the Bay of Fundy. Details on the characteristics of source, pathway, and receptor that will be used to conduct this assessment are provided in Table 1.

Source: Blasting Characteristics
- Source Location
- Source Intensity
- Detonation Timing
- Scheduling
Pathways: Sound Energy Propagation
- Possible Sound Energy Pathways
- Influence of Environmental Conditions
- Propagation Modelling
Receptors: Marine Mammals
- Occurrence
- Acoustic Sensitivity
- Biological Effects
Mitigation and Monitoring
- Mitigation
- Monitoring

Table 1. Assessment Framework for Effects of Onshore Blasting on Marine Mammals.

While existing literature can provide useful information on the state of knowledge related to noise and its impacts in the marine environment, and the proponent will be required to provide details on the project and any proposed mitigation, regional scientific expertise is used to help ensure that site-specific characteristics are taken into account in the application of this impact assessment framework.

Format
Each of the following sections begins with a description of information and/or analysis recommended as the basis for any assessment related to the impacts of onshore blasting noise on marine mammals. This is followed by information and/or analysis specific to the Whites Point Quarry assessment.

Source: Blasting Characteristics

Source Location

For the assessment of blasting on land, the distance of the source from the high tide mark will be used to determine the source levels entering the marine environment. Sound propagation paths will include air-to-water, rock-to-water, the latter including interference effects from reverberation within the water column itself. Where there would be multiple charges, the relative location of these charges will be used to determine the likely overlap of sound/pressure waves – with a particular focus on the potential for constructive interference resulting in higher than anticipated sound levels. To resolve this issue, information on source location will be evaluated in combination with information on blast timing (see below).

According to the original Blasting Plan (2002), the 56 initial charges would be laid in a 2.7 m by 2.7 m configuration with hole depths between 7.3 and 8.8 m (Nova Stone Exporters Inc., 2002, see Figure 1). Subsequent blast configurations have not been described.

Source Levels

Explosive detonations, while carefully controlled, are influenced by a variety of factors that make accurate determination of source levels difficult. For determination of pressure levels propagated through the air, the source is best described by its size, i.e. the size of the charge can be associated with an estimated concussion some distance away. In this framework, we are interested in the sound propagation from an onshore detonation into the marine environment. The role of multipath propagation, discussed in more detail below, makes a simple model of blast sounds based solely on charge size problematic.

For the Whites Point Quarry project, the load per hole is proposed as 45 kg ammonium nitrate-fuel oil (ANFO) explosives at 4.6 lbs/foot. The concussion from the air blast is estimated to be 128 dBA or less within 7 meters of the nearest structure not located on the site (Nova Stone Exporters Inc., 2002).

Detonation Timing

Blast timing would influence both the levels of sound entering the receiving environment and the likelihood that the sound would be received by some receptor. As mentioned previously, timing of individual blasts would influence the cumulative energy produced in terms of the potential for beam forming, i.e. where impulsive sound is emitted from multiple sources timed in such a manner that a receiver at range in certain directions would perceive the combined sounds from more than one source as a single source.

According to the proponent, blasting at Whites Point Quarry could be conducted at any time of the year. Blasting would not be conducted on Sundays or between 1800 and 0800 hours (Blicon of Nova Scotia Corporation, 2005). The original blasting plan proposed an average delay between blasts of approximately 25 milliseconds (ms), but this was subsequently reduced to 8 ms for safety reasons in the Hannay and Thomson report, 2003.

Assuming acoustic energy to be radiated as short impulsive signals of dominantly high frequency content, beam forming can occur whenever the sound propagation interval between any arbitrary pair of shot holes exceeds the pair-specific inter-hole delay time. Assuming a local propagation velocity of around 3 km/s, sound should propagate across the shot pattern largest dimension in about 10 ms or so. Therefore some degree of "beam forming" is still theoretically possible. However, preliminary examination does not indicate any instances where sound energy would be beamed straight at the nearest part of the coastline. In part, this may be due to the specific layout of the lines and the onset of the detonation sequence at the westernmost corner (see Figure 1).

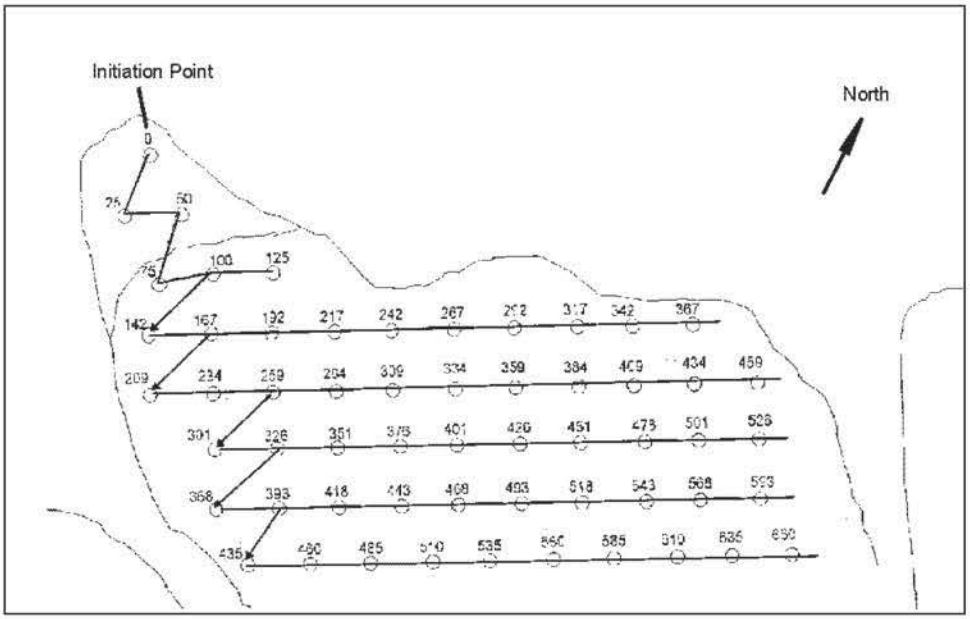

Figure 1. Proposed Initial Blast Sequence (Nova Stone Exporters, 2002). Note: The proposed timing delays have since been modified, thus this diagram should only be considered to reflect the relative timing of shots.

The modification to produce a minimum of 8 ms delay between any two blasts over the entire pattern is expected to be less effective than 25 ms delays but far better than no delay, i.e. simultaneous detonation of all shot holes.

Scheduling

Blast schedule would influence the potential for cumulative effects of multiple exposures on receptors present in the vicinity of the blast site.

For Whites Point Quarry, the proposed frequency of blasting during quarry start-up will be once per week and once every two weeks during full production (Blicon of Nova ScotiaCorporation, 2005). Thus, these acoustic events will be temporally isolated, in contrast to the continuous or semi-continuous (over periods of weeks to several months) transmissions that are characteristic of offshore seismic exploration.

Pathways: Sound Energy Propagation

Possible Acoustic Pathways

Acoustic pathways which could result in sound exposures that have the potential to cause effects on marine mammals include:

- Sound waves propagated through the air to be received by marine mammals situated at the ocean surface or at nearby haul out sites.
- Pressure waves propagated through substrate and then through the water column to be received by submerged marine mammals.
- Vibrations propagated through substrate to be received by marine mammals that may be in contact with the sea floor [considered highly unlikely].

Multi-path considerations, i.e., sound propagation through multiple pathways to reach a receptor, will be important. For example, it is possible that energy may propagate through the substrate, into the water column and directly to a receiver *or* pressure waves could also reflect off the ocean surface before reaching the same receiver. Another example of multi-path propagation can occur when underwater sounds are transmitted both directly through the water, and in a parallel direction through the sea bottom; this has been true for seismic sounds transmitted through both water and the subsea permafrost in the Arctic ocean (see review in Lawson and McQuinn 2004).

Within the first kilometer or two, acoustic energy is communicated into a wedge-shaped deepening water column from the underlying substrate. The combined effects of direct path energy and energy reflected off the water surface are probably dominant but more complex multi-path reverberation effects will also be present. The presence of shear elasticity in the substrate would appear to allow the substrate energy to be more efficiently coupled into the water column than in the case in which shear is absent.

Beyond a few kilometers range we are most likely dealing with a propagation problem for energy already communicated into the water column. Wave guide dimensions and sound speed structure existing within the water column could be important for energy propagation to ranges of tens of kilometers. Sound speed structures could tend to refract sound into the comparatively

lossy[1] bottom or, conversely, to isolate the water column propagating sound from such interactions. At present, reliable modelling of this effect cannot be done as the coupling of sound energy into the water column is more complex than for the case of exploration seismics. Therefore our conclusions on this are qualitative and speculative.

Environmental Conditions

The physical environment in which a blast is situated would play a major role in the likelihood that energy will be propagated towards some receptor in a manner sufficient to cause biologically significant impacts. In this case, the physical environment under consideration includes the bedrock in which the explosives are situated, the substrate through which energy is propagated between the blast site and the marine environment, the characteristics of the water column and underlying seafloor, topography and bathymetry, and possibly the atmospheric conditions which may influence the propagation of airborne sound waves.

For the Whites Point Quarry project, the proposed initial blast location is situated on Jurassic north Mountain basalt bedrock that underlies the entire quarry and extends into the nearshore marine environment. The intertidal zone is rocky with a well established macroalgal community. Approximately 50 m offshore, there is an area with a layer of sand covering the bedrock with some outcrops and boulders. Water depths at distance from the lowest average tide are provided in Table 2. It is important to note that the geometry, i.e. water depths at a given location and distance to water edge, vary over the tidal cycle.

Table 2. Water depth at distance from lowest normal tide.

Water Mark (m)	Depth (m)
60	2
120	5
180	10
240	20
540	30
1020	40
1380	50
1620	60
2580	80
4020	100

Propagation Modelling

In the absence of field measurements, determination of the propagation characteristics of explosive sound energy through bedrock into the marine environment must rely on numeric modelling. Ideally, such modelling would take into account source characteristics, bottom topography, water column properties, and ambient underwater noise levels. Results of

[1] Downward refractive conditions in the water column, such as exist on the continental shelves at Nova Scotia latitudes during summer months, tend to steer near-horizontally propagating sound downward toward the bottom where subsequent reflection, even beyond the critical incidence angle, leads to some excess bottom loss from absorption and scattering.

propagation modelling typically describe the intensity of sound pressure pulses at various distances from the source (decibels relative to 1μPa in water). The frequency content and rise time of the pulse are two other measures of importance to the determination of potential impacts on marine life.

Sound propagation modelling of a single 45 kg ANFO charge detonated at 6 m was provided by the proponent (Hannay and Thomson, 2003). This modelling predicts that "…the pressures at even the closest location in the water are not expected to exceed 50 kPa [214 dB re 1μPa peak pressure]. If the blasts are performed within 3 hours of low tide then the maximum pressures will likely remain less than approximately 25 kPa [208 dB re 1μPa peak pressure] in the water." At 500 m, this modelling predicts that the peak sound pressure would be approximately 2 kPa in the water column, which equates to approximately 186 dB re 1μPa (peak pressure). The rise time of the pressure wave is described as increasing with increasing distance from the blast. The conclusion is made that "effects of peak pressure would be less than those predicted from a high explosive source" (Hannay and Thomson, 2003). The frequency content of the pressure pulse is not provided. Modelling of long-range sound propagation (beyond 500 m) was not conducted.

In general, sound propagation modelling conducted by the proponent is consistent with analysis that has been conducted by DFO Science. Results, i.e. sound levels in the water column at 500 m of 186 dB re 1μPa (peak pressure), are expected to represent the worst case estimate for a single blast.

Sound propagation modeling conducted by the proponent makes use of a reference to Oriard (1985). In particular, Figure 1 in the Oriard paper is provided as Figure 3 in Hannay and Thomson (2003). The data in this figure quantitatively agrees with DFO calculations when strictly interpreted as an 'energy ratio' as labelled. However, Oriard interprets 'energy ratio' as "the squares of the amplitudes of reflected and transmitted waves relative to those of the incident waves." This interpretation, which is used by Hannay and Thomson in the caption to Figure 3, is thought to be incorrect. Hannay and Thomson do qualify the equivalence with the word "approximately". DFO calculations show that the amplitude of the water transmitted P wave is lower than that stated by Hannay and Thomson, although higher than that calculated neglecting shear in the substrate altogether.

Modelling of multiple blasts (8 ms separation time) has not been provided by the proponent. At 500 m range within the water column, successive pressure pulses at 8 ms separation may be sufficiently closely spaced to partially overlap. However, overlap is expected to extend the length of the resultant superimposed pulse rather than to increase its amplitude.

No ambient noise measures have been made in this area. If there is a relatively high level of natural and pre-existing anthropogenic underwater noise, blast sounds might attenuate to these higher background levels more quickly than in quieter areas. However, without ambient noise measures we cannot assume this to be true.

Receptors: Marine Mammals

Occurrence

Marine mammals must be present in order for there to be any reasonable expectation of impact from the noise of onshore blasting. Ideally, it would be useful to be able to reference seasonal observations within the expected zone of influence of noise for a proposed project. This would establish the seasonal occurrence of potential receptors. In the absence of site-specific observations, regional observations and datasets should be accessed. In addition to determination of the presence and timing of marine mammals in general, the potential presence of protected species, i.e. species for which there may be a higher level of risk aversion, should also be determined.

Table 2 shows the marine mammals listed on Schedules 1-3 of the Species at Risk Act that may be found in the Bay of Fundy during the proposed blasting at Whites Point Quarry. The most likely timing of their expected presence in the Bay of Fundy is provided, along with their current status under SARA and COSEWIC. Other marine mammals that are known to occur within the Bay of Fundy are provided in Appendix B.

Species	*Timing*	*SARA Status*	*COSEWIC Status*
North Atlantic right whale	Jun –Nov	Schedule 1: Endangered	Endangered (2003)
Blue whale	Jun – Nov	Schedule 1: Endangered	Endangered (2002)
Harbour porpoise	All Year	Schedule 2: Threatened[1]	Special Concern (2003)
Fin whale	All Year	Schedule 3: Special Concern	Special Concern (2005)

Table 2. Timing and Status of SARA Marine Mammal Species in the Bay of Fundy.

Whites Point Quarry lies about 22 km from the center of the Grand Manan Basin summer/fall congregation area of the endangered North Atlantic right whale. Observations of right whales in this area are available from the right whale consortium database, which is housed at Rhode Island. In 2002, a map of North Atlantic right whale sightings per unit effort within the Bay of Fundy was compiled as part of the proposal to the International Maritime Organization (IMO) to alter the shipping lanes in this area (Figure 2). This map is useful in that it takes effort into account, i.e. it addresses the fact that the density and distribution of right whale records will be related to the intensity and distribution of observational effort; however, it only includes data from 1987-2000. From this map, it appears as though there have been limited observations (effort and/or sightings) of right whales immediately adjacent to the proposed Whites Point Quarry location; however, sightings per unit effort adjacent to Long Island have been in the order of 1-16 whales per 1000 km of survey track (all months).

[1] DFO has recommended that the assessment of harbour porpoise be returned to COSEWIC for further information or consideration (Canada Gazette, Dec. 10, 2005).

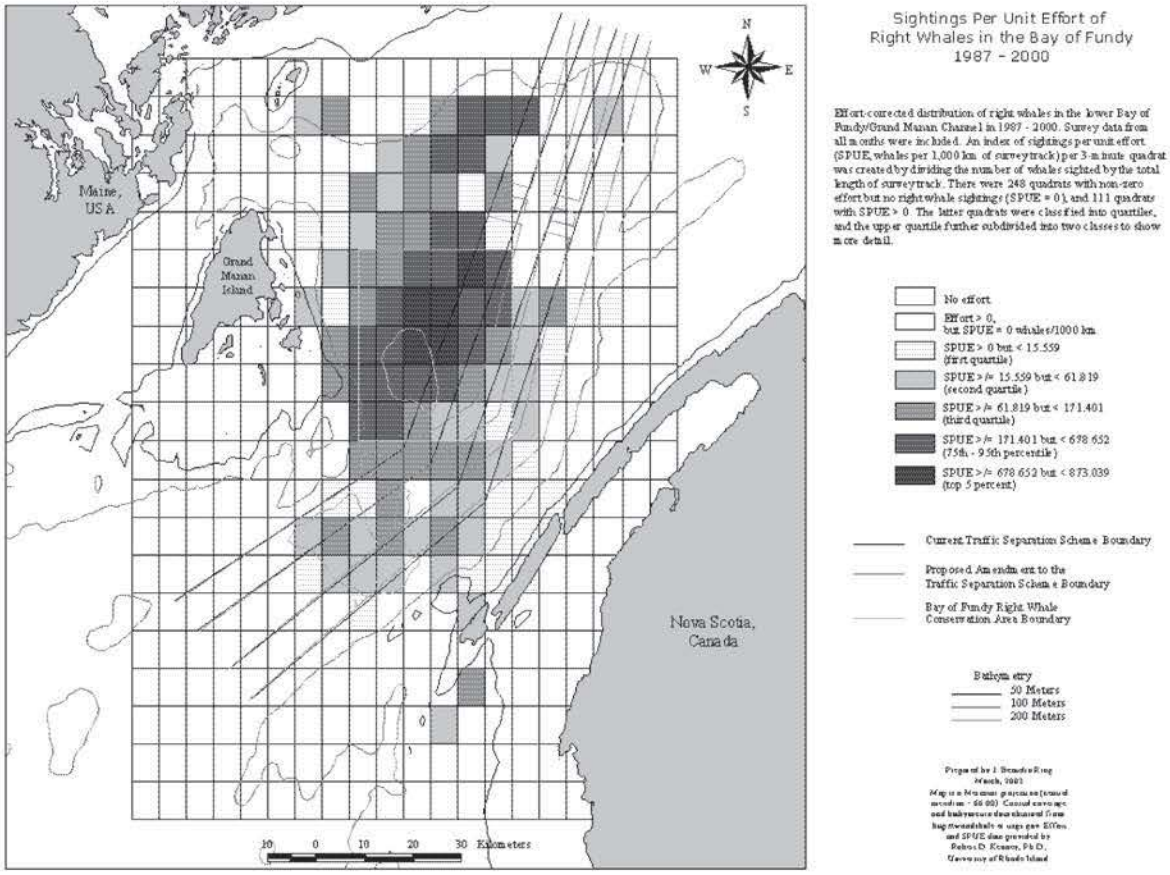

Figure 2. North Atlantic right whale sightings per unit effort in the Bay of Fundy (1987-2000).

A marine mammal survey was conducted by the proponent within 1 nm of the coastline between East Ferry and Sandy Cove in July and August 2002. No North Atlantic right whales were observed; however, minke whales were sighted south of Whites Cove, a seal colony was observed in the vicinity of Crowells Cove, and seals were frequently observed in the waters off Whites Point (Nova Stone Exporters Inc., 2002).

Results from the Maritimes DFO sightings database (Figure 3) show that finback, humpback and minke whales, as well as harbour porpoises have also been sighted along Digby Neck. It should be noted that these results have not been corrected for effort, and the large number of sightings northwest of Digby Neck are due in part to the observation by a whale-watching company operating in that area. These maps should not be considered an accurate reflection of the relative density of whales and porpoises in the region, but they can be considered evidence of the occurrence of these species within the area.

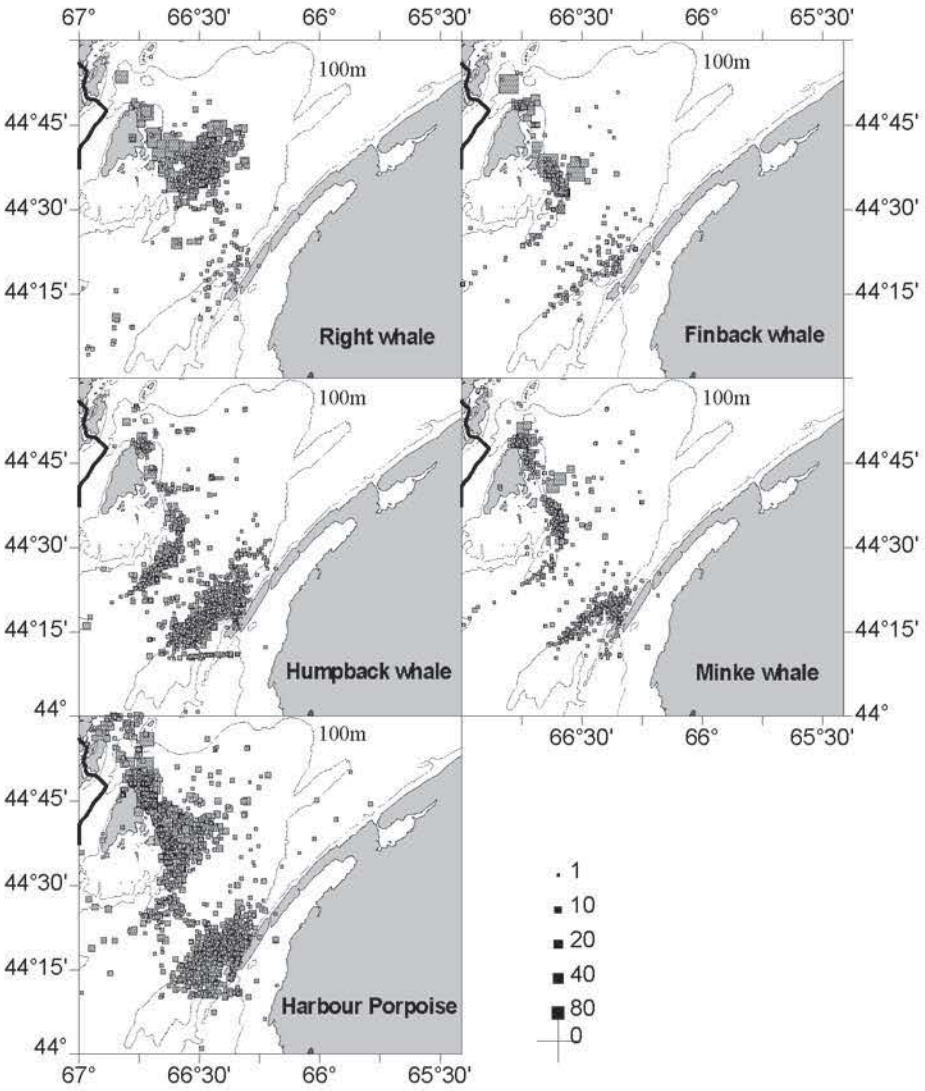

Figure 3. Sightings of North Atlantic right whales, finback whales, humpback whales, minke whales and harbour porpoise contained within the St. Andrews Biological Station sightings database (K. Smedbol, *pers. comm.*, 2005).

Acoustic Sensitivity

Marine mammals are well known to be acoustic animals that react to and are adversely affected by noise (for a recent review see Lawson and McQuinn 2004). While critical injury and temporary hearing sensitivity changes could result from certain impulsive sound exposures, these have not been documented in free-living marine mammals. On the other hand, there have been many documented marine mammal behavioural reactions to anthropogenic sounds. For instance, some large baleen whales have exhibited behavioural reactions, primarily displacement, when exposed to blasting sounds.[1]

[1] The limited available evidence indicates that marine mammals, like humans, show less reaction to discontinuous noise pulses with a given peak level than they do to continuous noise at that same level (see review in Richardson *et al.* 1995). However, some species of baleen whales exhibited some avoidance of areas where there are noise pulses with received peak pressures exceeded 160-170 dB re 1μPa (SEL) which is near 156 dB re 1μPa (SEL).

The acoustic sound pressure levels at which permanent hearing threshold shift or even temporary hearing threshold shift occurs are unknown. Because even slight damage to the hearing mechanism could be of serious impact to marine mammals highly dependent on acoustics to socially communicate and locate prey – not to mention avoidance of ship traffic – the question of auditory damage is an important one.

It is thought that baleen whales may be more sensitive to low frequency noise than toothed whales. However, studies of acoustic sensitivity have not been conducted for all species that may be present within the Bay of Fundy.

Seals are considered to be more behaviourally tolerant to loud sounds and to have less sensitive underwater hearing relative to many cetacean species.

According to the draft Statement of Canadian Practice on Mitigation of Seismic Noise in the Marine Environment (DFO, 2005. Note: this draft is under review and wording may change) , biological and ecological effects on marine mammals may be higher if there were to be behavioural consequences that would:

- displace feeding marine mammals from areas where there are no alternate areas;
- displace marine mammals from breeding or nursery areas; or
- divert migrating marine mammals from routes or corridors for which alternate routes or corridors either do not exist or would incur substantially greater physical costs to traverse.

The same would likely hold true for other types of noise in the marine environment.

Biological Effects

There is a high level of uncertainty in regards to the sound pressure levels that are required to generate biological effects in marine mammals.

The US National Marine Fisheries Service has been using 180 dB re 1 µPa (root-mean-square, rms) as the maximum acceptable exposure level to impulsive sounds for cetaceans, and 190 dB re 1 µPa (rms) for seals. These levels are considered to constitute "Level A" harassment under the US Marine Mammal Protection Act and were adopted to minimize temporary hearing threshold shifts along with more extreme physiological damage. "Level B" harassment is currently considered to occur at 160 dB re 1 µPa (rms) for impulsive sound and 120 dB re 1 µPa (rms) for continuous sound. These thresholds (including the 180 dB threshold) are currently being revisited (NOAA, 2005). It should be noted that these thresholds are given as rms measures and not peak pressure measures. To compare these thresholds to the sound levels predicted for the Whites Point Quarry project, one should add approximately 5 dB to the rms values as a rough conversion to peak pressure values. However, there are many conditions under which this relationship between rms and peak pressure is not valid.

Subtle behavioural effects, especially for baleen whales, have been documented to occur at much lower acoustic levels, particularly with longer exposure duration.

Canada has not proposed thresholds of acceptable or unacceptable sound exposure for marine mammals. In DFO's Guidelines for the Use of Explosives in or near Canadian Fisheries Waters (Wright and Hopky, 1998), it is recommended that explosives not be detonated within 500 m of any marine mammal and it is recommended that explosives producing an instantaneous pressure change greater than 100 kPa in the swimbladder of a fish not be permitted.

Mitigation and Monitoring

Mitigation

Mitigation proposed by the proponent (Bilcon of Nova Scotia Corporation, 2005) included use of a 500 m marine "safety radius" for marine mammals. To establish this zone, an observer, experienced and/or trained in marine mammal identification, would be positioned at an elevated shore position at least 1 hr prior to the start of blasting. The observer's task would be to detect and identify marine mammals within 500 m of the blast site. The observer would wear polarized glasses and be equipped with binoculars to enhance visual acuity. A two-way VHF radio or cellular phone would be used by the observer to communicate with the blast coordinator. In practice, blasting operations would be suspended if the observer sighted a marine mammal within the 500 m buffer zone, and would not resume until 30 min after these animals either were observed or were presumed to have left the buffer zone based on activity and swimming direction. It is unclear whether blasting would occur if weather conditions did not permit observations to 500 m.

A 500 meter safety zone for all marine mammals is a mitigation technique that might be effective at reducing the potential for physical effects, and it is consistent with DFO's Guidelines for the Use of Explosives in or near Canadian Fisheries Waters (Wright and Hopky, 1998). However, without measures of the underwater sound pressure levels and frequency characteristics during blast operations to confirm accuracy of modelling, and a better understanding of the sound levels that cause physical effects in marine mammals likely to be present within the Bay of Fundy, a more definitive answer to this question can not be provided. A monitoring program to investigate the underwater sound levels and frequency characteristics produced by blasting at various distances from the source would help to reduce uncertainty.

A 2500 meter safety zone for endangered marine mammals in the Bay of Fundy (blue whales and right whales) is likely to be effective for a single blast; however, concern remains about the potential effects of exposures to multiple blasts – particularly in quick succession (< 1 second). However, even with an elevated position it will be very difficult for an observer to detect a marine mammal at a distance of 2500 meters. Even if conditions are optimal for viewing (e.g., low glare, low sea state, at least 7×50 binoculars on a fixed pedestal), there can be whales and seals that can remain undetected - especially as they can swim underwater for kilometres without being detectable by surface observers.

Monitoring

Sound propagation modelling and analysis has been conducted for the initial proposed blasting arrangement. It is not clear from the proposal how "subsequent blasts will be designed based on the information gathered from monitoring the initial blast…" For instance, if ground velocities

monitored during an initial blast are lower than those predicted from the empirical formulas does this justify modifying the formula for future predictions? One should have more data than might be obtained from one proximate monitoring site during one shot to justify such changes. Depth of shot holes and hence possible coupling would vary for future blasts.

Initial or production blasts conducted when right whales are not present in the Bay of Fundy, during which underwater sound measurements are made and effective marine mammal monitoring is conducted, would allow for further assessment of the likely impacts of these blasts. If the sounds levels are undetectable at the nearest margin of the right whale area, and the buffer distances for marine mammal injury or severe disturbance are shown to be small, then perhaps the proponent could conduct such blasts near the waterline when right whales are present. On the other hand, if sound levels are detectable at great distances, or are dangerously high at distances underwater for which marine mammal monitoring is ineffective, then the proponent could be required to modify their blasting protocols (smaller charges, fewer in sequence, shallower depths, further back from the shoreline) or schedule (conducted when right whales are less likely to be present). However, some consideration should be given to the potential for differences in acoustic propagation conditions at different times of the year, e.g. when right whales are present versus when they are not.

Underwater sound measurements should be made at 500, 1000, and 2500 meters from the initial blast site. Ideally, the proponent should also measure sounds levels at the "edge" of the right whale aggregation area, although it is suspected that the sounds levels will attenuate below the ambient sound levels at this distance in this relatively shallow marine environment.

Pre-, during, and post-blast observations of the harbour seal colony during the breeding season when behavioural disturbances are likely to have the greatest risk of biological effects through separation of mothers and pups is recommended. These observations should be conducted by an experienced biologist.

Longer-term or subtle behavioural effects, if induced in endangered right whales following blast sound exposure, may be very hard to detect and quantify. Such questions can be addressed only with a well-designed, broad-scale research programme.

Conclusions and Advice

While the zone of disturbance of marine organisms by sound may extend beyond the 500 m suggested in the Whites Point Quarry proposal, it is considered unlikely that blasting would result in physical effects on marine mammals, endangered or otherwise, beyond 500 m. However, there is a high level of uncertainty associated with this conclusion. If the project proceeds, an initial blast prior to project initiation would help to validate the sound propagation modelling used to reach this conclusion and would significantly increase the level of certainty in short-range impact estimations.

Subtle behavioural effects on marine mammals are expected to extend beyond 2500 m from the blast site. However, these are not expected to result in overall changes to the distribution of the population or other population-scale impacts. There is a moderate level of uncertainty associated

with this conclusion. An initial blast as described above would also help to increase the level of certainty in long-range impact estimations.

Proposed mitigation, i.e. the 500 m safety zone for marine mammals and the 2500 safety zone for endangered marine mammals, is expected to reduce the potential for harmful impacts of blasting on marine mammals under good visibility conditions.

The following research and monitoring recommendations would help to verify the results of this assessment:

(1) Calibrated blast sound measures in near- and far-field locations prior to operational blasting and arrival of endangered right whales in the Bay of Fundy.
- Measure the underwater blast sound levels at 500, 1000 and 2500 meters, plus at the margin of the right whale core area, during blasting conducted prior to or after right whale presence.
- Schedule blasting such that shots are made prior to or after right whales are expected to be present; if measurements reveal low levels at distances that can be monitored effectively, then permit operations.
- Marine mammal monitoring by trained observers should occur prior to and during any blasting, as proposed, but the observer should use at least 7x50 binocular on a pedestal to ensure the ability to better detect marine mammals at greater distances.

(2) Visual observation of marine mammal behaviour before, during, and after operational blasting – especially of known marine mammal aggregations, i.e. during seal pupping.

(3) Testing of the effectiveness of visual observation methods at 2500 m from the blast site is also recommended, including determination of the average site visibility conditions.

(4) Use of ongoing passive acoustic monitoring should be considered.

(5) Opportunities to link up with other research initiatives, e.g. university research, should also be considered.

Sources of Uncertainty

Uncertainty in the sound propagation modelling.
It is still unclear from the Oriard model (Hannay and Thomson, 2003), whether the pressure levels experienced at 500 m and beyond where water depths, at least as gleaned from the charts above, become significant, resulting in less effective cancellation of the water surface reflection. Shot overlap also becomes a greater problem.

Questions remain as to the validity of Oriard (1985) results presented in Figure 3 of Hannay and Thomson (2003). The problem involves P to S wave conversions and reflections at the interface between the elastic solid and the overlying liquid. The only applicable and accessible literature treatment of this problem is in a 1960 translation of a book by L.M. Brekhovskikh (1980). A computer simulation of the problem based on Brekhovskikh's solution was set up by DFO. Using the parameters of Figure 3, good agreement for "Reflected P" and "P Reflected as S" with the Hannay and Thomson results is obtained over the full range of incidence angles. However, the critical "Transmitted P" values do not agree. This may be a typographical error in Brekhovskikh's "Transmitted P" formula since Oriard's three results, as a group, obey energy conservation while Brekhovskikh's do not. Brekhovskikh's "Transmitted P" result can be brought into accord with Oriard's by changing one exponent in the former's analytical formulation.

Once this error is corrected, a DFO computer simulation gives a pressure (amplitude) transmission coefficient of only 0.057 at an incidence angle of 80^0 compared to the easily derived value of 0.03 on neglecting shear in the substrate. The former value is much smaller than the upper estimate of 0.3 quoted by Hannay and Thomson (2003). It appears they neglected the acoustic impedance differences between the upper and lower media and the change in physical width of the energy beam in crossing the interface when they converted transmitted to incident P wave energy ratios into pressure transmission coefficients. If this is indeed the case, the acoustic pressure levels transmitted into the water are much lower than Hannay and Thomson have estimated.

Incidence Angle ^{0}	Pressure Transmission Coefficient
70	0.080
80	0.057
85	0.014

Uncertainty in the behavioural responses of marine mammals.
Marine mammals are individuals that may behave unexpectedly at times. It is difficult to account for these individual differences, and typically only general behavioural trends are considered in analysis of potential impacts. However, use of a trained observer to monitor the 2500 m and 500 m buffers should help to provide flexibility in response to any unexpected behaviours. However, there is also some uncertainty related to the ability to detect marine mammals at distances of 2500 m, particularly under poor visibility conditions.

Contributors

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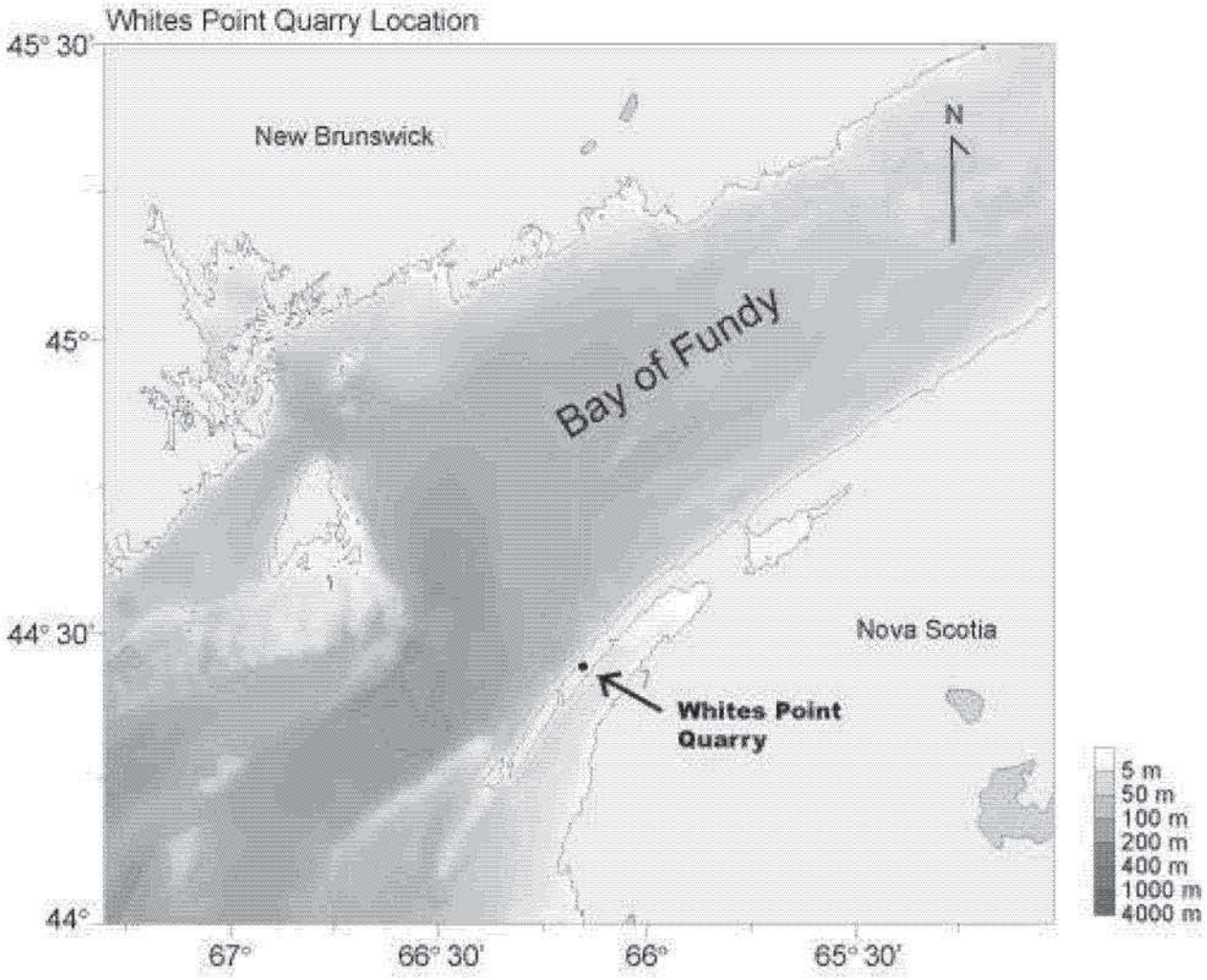
Appendix A. Location of Whites Point Quarry



Appendix B: Marine Mammals in the Bay of Fundy

Cetaceans

Common name	**Occurrence in the Bay of Fundy**[1]
North Atlantic right whale	Common
Minke whale	Common
Fin whale	Common
Northern minke whale	Common
Finback whale	Common
Harbour porpoise	Common
Humpback whale	Occasional to common
Atlantic white-sided dolphin	Occasional to common
Long-finned pilot whale	Occasional
Sei whale	Occasional
Sperm whale	Occasional
Blue whale	Rare
Pygmy sperm whale	Rare, sporadic visitor
White-beaked dolphin	Rare, but previously common
Northern bottlenose whale	Extremely rare

Seals

Harbour seal	Common
Grey seal	Occasional but increasing
Hooded seal	Rare
Harp seal	Rare

[1]Pohle, G., L. Van Guelpen, A. Martin, D. Welshman, and A. McGuire. 2004. Bay of Fundy Species Information. World Wide Web electronic publication. Retrieved December 15, 2005, from http://gmbis.marinebiodiversity.ca/BayOfFundy/background.html (version 1.0/2004)

PRACTICAL METHODS TO REDUCE AMMONIA AND NITRATE LEVELS IN MINE WATER

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ABSTRACT

Most commercial explosives contain 70 to 94% ammonium nitrate, by weight. When portions of these explosives end up in shot rock and ore, through spillage or incomplete detonation, ammonia and nitrates leach out of them and into ground water. In recent years, State and Federal regulators have been applying more stringent water quality standards, particularly at new mines and development projects. Bulk ANFO, a mixture of ammonium nitrate and fuel oil, is the explosive of choice at most mines, when mining conditions allow it. ANFO use is desired because it less costly than other explosives, but when spilled it dissolves readily in water. Several case histories in the United States and Canada show a clear connection between uncontrolled losses of bulk explosives and high nitrate levels in mine effluents.

Mining companies have tried several approaches to reduce ammonia and nitrate levels in groundwater. They either control explosive losses, or they treat mine effluents at the end-of-pipe. This paper addresses the former solution -- controlling explosive losses. For both packaged and bulk explosives, guidelines designed to limit losses during storage, handling and use, are described in detail.

AMMONIA AND NITRATE TOXICITY

Relatively small concentrations of ammonia in water are very detrimental to fish, and particularly to most trout species. The toxicity of ammonia varies with pH and temperature. Researchers have found that, at lower temperature and pH, the toxicity of free ammonia increases (Wiber, M., et al, 1991). In aqueous solutions, ammonia exists in two forms: free ammonia which carries no ionic charge (NH_3) and ammonium which carries a positive charge (NH_4^+). The free ammonia is the more toxic of the two. The U.S. EPA ambient water quality criterion is 0.02 mg/l free ammonia. For U.S. mines NPDES permits commonly include a limit of 10 mg/L total ammonia as N in end-of-pipe effluents. The U.S. EPA drinking water criterion for nitrate as nitrogen (NO_3^--N) is 10 mg/l. In warm blooded animals, nitrate can be reduced to nitrites in the gastrointestinal tract. The nitrite reaches the bloodstream where it reacts directly with hemoglobin to produce methaemoglobin that impairs oxygen transport.

AMMONIA AND NITRATE SOURCES

Many mines have learned that there is a direct relationship between ammonia and nitrate levels in water and the amount of undetonated explosives in the rock through which the water flows. Most commercial blasting agents contain from 70 to 94% ammonium nitrate. ANFO, the most commonly used blasting agent, is usually a mixture of 6 percent #2 diesel fuel oil (DFO) and 94 percent ammonium nitrate. ANFO readily dissolves in water, releasing both ammonia and nitrate. Emulsion and watergel based explosives also contain a large amount of ammonium nitrate and other oxidizing salts that can leach nitrates to ground water. The rate at which nitrates leach from different explosives varies dramatically, based on the explosive's composition.

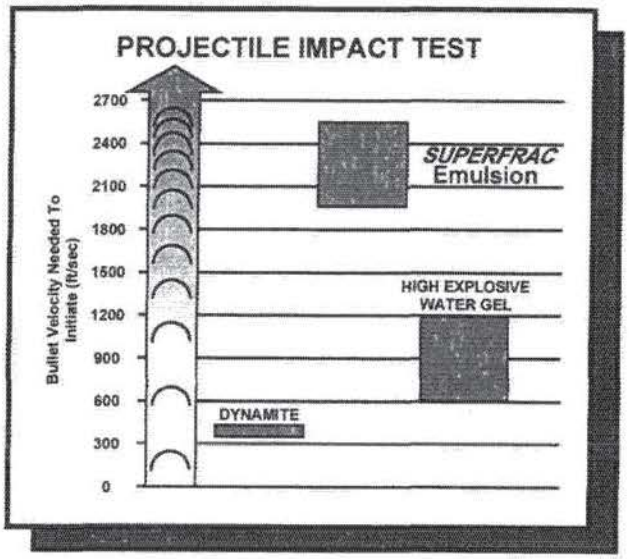
In tests conducted at the ICI Explosives Technical Center in McMasterville, Quebec, nitrate leaching rates were established for:

1) Standard ANFO
2) WR "Water Resistant" ANFO
(ANFO with additives to inhibit the ingress of water)
3) Detonator sensitive watergel
4) Detonator sensitive emulsion

PERCENTAGE OF NITRATES LEACHED FROM EXPLOSIVE*				
Time (hrs)	ANFO	WR ANFO	WATERGEL	EMULSION
0.1	~ 25	-	-	-
1	> 50	~ 25	-	-
6	-	-	24.6	0.6
144	-	-	> 75	1.2

* When 25% of the nitrates are dissolved, the explosive is probably no longer detonable.

As expected, the emulsion did not release nitrates as readily as the ANFO or watergel explosive. The leaching rate for emulsion explosives is much lower because the ammonium nitrate is contained in an aqueous phase that is surrounded by an oil, or oil and wax, fuel phase. Hence, when water contacts undetonated emulsions, the ammonium nitrate is protected by the relatively impervious oil and wax matrix. Despite their very slow leaching rates, emulsions--when given enough water exposure time--can produce significant levels of nitrates and ammonia. In comparison, spilled ANFO will quickly dissolve in water and release all its ammonia and nitrates. If continuously spilled, the daily level of nitrates and ammonia released by any type of explosive--exposed to water--will eventually become significant. The ammonium nitrate leaching rate for packaged explosives will vary based on the integrity of the package. However, this is usually a moot point because packages of undetonated explosives are almost always ruptured by the violent rock movement within the blast. Despite being ruptured, the packaged explosive can often be recovered from shot rock. Nitroglycerin (NG) based dynamites will also leach ammonia and nitrates at varying rates based on their composition. In addition, NG sensitized products are much more sensitive to shock impact; for this reason, as well as environmental concerns, the occurrence of unfired dynamite in shot rock should be prevented.



In underground metal mines, noxious levels of ammonia gas often occur when undetonated explosives mix with alkaline water draining from cemented fill or grouting operations (Joyce, D.K., 1992). This parallel ammonia problem is another reason to control explosive spills.

The conclusion from this analysis is that losses of all types of explosives must be controlled, regardless of their composition or packaging.

MANAGING EXPLOSIVE LOSSES

There are several ways that undetonated explosives end up on the ground or in shot rock. First, sloppy handling, storage, and loading practices may cause a significant amount of explosive spillage, particularly when bulk explosives are used. Poor drilling and loading practices can also create significant amounts of undetonated explosives. Charges are often disrupted or torn away by premature rock movement caused by earlier detonations. Drill patterns, stemming or collar length, explosive selection, priming methods, and delay timing are the elements of blast design that can be adjusted to control charge cut-offs or failures.

In a paper presented at the 1991 Northwest Mining Convention in Spokane, Washington, the authors present water monitoring case histories from three separate underground mines in Canada (Wiber, M., et al, 1991). In all three cases, the levels of ammonia in mine water were lowered by at least 50 percent after rigorous explosive management programs were started.

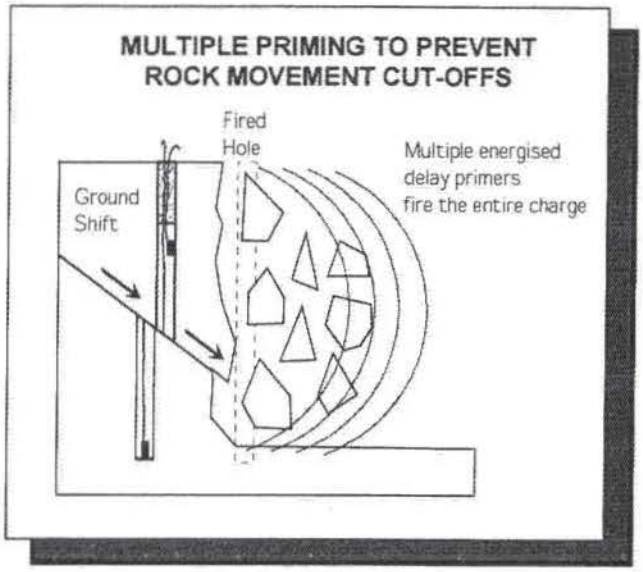
Storage And Handling Controls

In both surface and underground mining, ANFO and bulk emulsion blasting agents are often spilled during storage, transfer or loading. Bulk ANFO commonly spills out of poorly designed or damaged bins, rail cars, and transfer augers. Bulk emulsion spills are often seen at storage tank outlets and at pump transfer areas. Maintenance employees are an important part of a complete explosives management program. They should understand that all bins, tanks, storage trailers, and loading equipment should be regularly maintained to prevent explosives spills. Employees who understand the importance of preventing explosive spills can greatly reduce their occurrence. However, no level of training will completely prevent all spills; so it is important to develop spill containment and clean-up procedures. To contain spills, some surface mines have placed their bulk explosive bins in concrete containment tanks or they have built rock berms around tanks and bins. Explosive manufacturers can usually provide spill clean up recommendations for their products, and in many areas they can provide special mobile clean-up crew and equipment services.

Blast Design Considerations

For safety, environmental, and economic reasons, blast designs should include measures that ensure complete detonation of all explosives. For this analysis, any charge or portion of a charge that fails for any reason is considered a misfire. Some common causes of misfires, along with design practices that will prevent them are:

Cut-offs: We can not control ground conditions, but we can control drill patterns, explosive loads, and initiation methods. In ground with weak seams or joints, the gasses and shock from early firing charges can cause premature movement of the rock containing adjacent, unfired holes. When the rock moves it separates or cuts off the explosive columns within it. The portions of the columns that do not contain energized primers will misfire and contribute ammonia and nitrate to ground water. Many of these misfires can be prevented by using multiple in-hole delay primers.

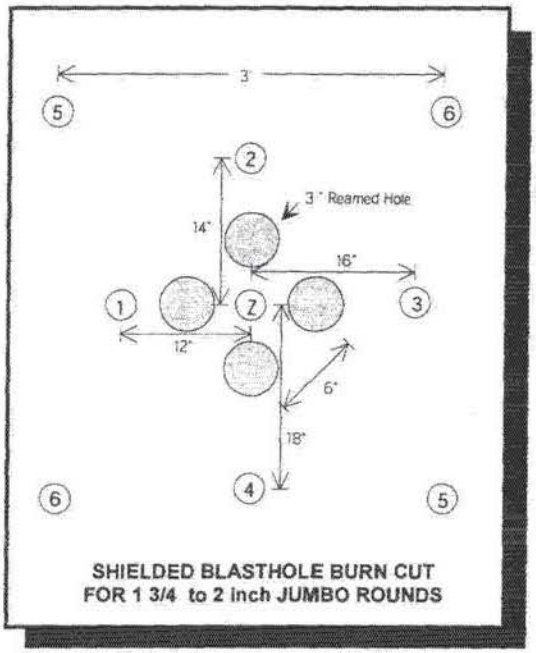


Some failures occur because there is too much delay time between adjacent holes, or rows of holes. In these situations, reducing the delay time between holes can reduce cut-offs. Cut-offs and explosive losses often occur when detonating cord downlines and surface delays are used in bench blasting. When detonating cord is used without a delay detonator in the hole, the ground swell that occurs when the first row of holes fires, can tear cord and delay connections before they fire, hence causing multiple hole failures. This type of cut-off can be prevented by using Fully Activated Sequential Timing (FAST) systems that use relatively long in-hole delays in combination with short surface delays.

The goal with these systems is to have all of the in-hole initiators sequentially energized before the first charges fire and rock starts moving. In very large shots that can not be fully energized, try to have at least two rows energized behind the row that is firing. FAST sequential timing can be achieved with either nonelectric or electric initiation systems.

Precompression Failures: Several blasting problems can occur when hole-to-hole shock pressures are too high. High blast induced pressure in rock can cause sympathetic detonation (propagation) of dynamite charges, and pre-compression failure in emulsion and watergel explosives. Many blasting incidents, often with severe damage to nearby structures, have been caused by propagating dynamite. In critical blasting areas, the propagation hazard is virtually eliminated by substituting less sensitive explosives for dynamite. However, under certain conditions, packaged emulsion and watergel explosives can fail when rock or gas pressure from an adjacent charge squeezes them to a density above their critical limit. This pre-compression or "dead-pressing" phenomenon is caused by several conditions or combinations of conditions. When ground is very seamy and wet, the magnitude of hole-to-hole shock is greatly increased. Shock also increases when holes are very close together which is always the case in underground tunnel and surface ditch blasting, where the application demands tightly spaced holes. If precompression failures occur, try spacing blastholes farther apart, or switch to an explosive that can withstand higher pressures. In tunnel rounds, the holes in the burn cut are usually spaced very closely together. The hole-to-hole pressure transmitted to the charges in these holes can be reduced by placing unloaded relief holes between the loaded holes.

Poor explosive choice: The type of explosive used can have a dramatic effect on overall losses. For instance, if bulk instead of packaged explosives are used, spillage losses will be relatively high. If bulk ANFO is used in wet holes, losses caused by complete failures or partial detonation will be high. At one underground metal mine in the northwest U.S., their total daily limit of nitrates in ground water is 100 pounds. To meet this limit they can not tolerate any spillage, so they use only packaged explosives. Moreover, they use a special emulsion product with a distinctive orange color that can be seen and removed from shot rock.



SHIELDED BLASTHOLE BURN CUT
FOR 1 3/4 to 2 inch JUMBO ROUNDS

When conditions that cause very high hole-to-hole shock pressures exist, only explosives that can resist pre-compression should be used.

Loading Controls

Without specific controls, mines using bulk ANFO typically lose 2 to 5 percent to spillage, or blow back -- during pneumatic loading underground. Surface auger-loading trucks with poorly designed -- or aimed -- discharge hoses spill ANFO prills onto the ground around hole collars during loading. Blowing wind can also add to losses by carrying some prill away from the hole if the discharge hose is too high in the air. Blasters that are conscientious and aware can prevent most spills by simply adjusting their loading practices.

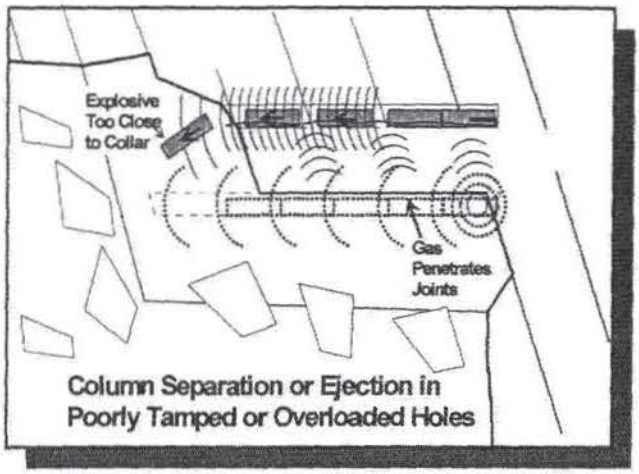
Moreover, when spills do occur, they must know how to clean them up and also understand the importance of doing it.

For some loading applications, explosive makers are developing specialized equipment and products designed to reduce explosive losses. For instance, pneumatic ANFO metering devices can reduce blow loading losses by metering a preset amount of explosives into a blasthole, thus preventing overloading.

Explosive manufacturers have also developed specially formulated tacky ammonium nitrate and fuel mixtures that reduce blow back losses.

In many underground blasting applications, overloading is the greatest cause of explosive losses. When long period delay detonators are used to delay tunnel and other development rounds, the charges in the later firing holes are subjected to tremendous shock and gas pressure generated by the earlier firing charges. This shock and pressure often tear away the rock around the collars of adjacent and yet unfired holes. Any explosive, whether in stick or bulk form, that is in this collar region is cut off and ends up -- undetonated -- in the shot rock. To control these losses, minimum open collar lengths should be established for all underground blast loads, based on geological conditions and application. Cartridge ejection from hole collars will also cause explosive losses. Ejection losses can be reduced by firmly tamping the cartridges near the hole collar. However, remember to never the tamp the primer stick; this practice is dangerous and it is prohibited by MSHA. When charge tamping will cause overloading, the explosive column can be secured by some type of hole plug. To accurately implement good blast designs, operations must have proper loading equipment and trained employees. Loading equipment should be well maintained and in some cases, mines should consider using computerized bulk loading equipment that meters preset weights of explosives into blastholes.

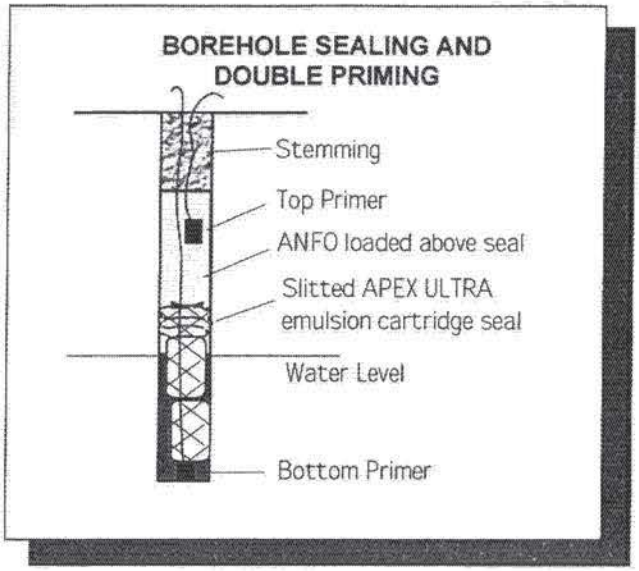
Sometimes during loading, packaged explosives columns are separated when rock chunks fall in the hole or a cartridge becomes stuck. When this occurs, the separated portion should be separately primed with the same delay detonator used in the initial primer. Use of the same delay will prevent one part of the separated charge from disrupting the other, and the desired firing sequence will be maintained.



Column Separation or Ejection in Poorly Tamped or Overloaded Holes

Loading bulk ANFO into wet holes, or letting ANFO sleep too long in wet or damp holes, is another common cause of explosive loss. When water comes into contact with ANFO, it either dissolves it or wicks into it and desensitizes it. In either case the ANFO charge partially or completely fails to detonate. In underground development rounds, static drill water should be blown out of holes with compressed air before pneumatically loading ANFO. In top loaded vertical holes, water resistant cartridged or bulk explosives should be substituted for ANFO.

In wet holes, packaged explosives are often loaded until out of water and the load is finished with ANFO. If the hole is not sealed, the ANFO will sift past the packaged ANFO and dissolve in the water. The water will cause further ANFO loss when it wicks up the sifting ANFO and into the main column. This problem is a common cause of misfires in bench blasting applications. Holes should be sealed with a fully coupled and waterproof explosive before loading ANFO. A good seal can be made by dropping a cut stick of an emulsion explosive into the hole, before pour loading ANFO.



CONCLUSION

At all mines, significant reductions of ammonia and nitrate in mine water can be achieved by developing an aggressive and ongoing explosive management program. At three different mines in Canada, the implementation of rigorous explosive management programs reduced ammonia levels by at least 50% in all cases.

As responsible stewards of our environment, mining companies and explosive suppliers should work together to establish products, loading equipment, and training programs aimed at lowering toxins in mine effluents. Explosive manufacturers, aware of these environmental concerns, are developing new explosive products and loading equipment specifically designed to reduce explosive losses. Excellent slide and video training programs for explosive handlers are also available. Please accept this call to action and work with your explosive suppliers to prevent ammonia and nitrate compliance problems. Mines that wait to act until ammonia and nitrate limits have been exceeded, will pay huge remedial control costs.

REFERENCES

1. Joyce, D.K., 1992, "Ammonia Gas Generation from Ammonium Nitrate in Alkaline Conditions," ICI Explosives Canada Report, 1992.

2. Wiber, M. et al, 1991, "Environmental Aspects of Explosives' Use," Northwest Mining Association Short Course Report, Spokane, WA, Dec. 1991.

3. Watson, C.G., 1991, "Ammonium Nitrate Leaching from Explosives," Internal ICI Explosives Report, Explosives Technical Center, McMasterville, Quebec, Canada, Feb. 1991.

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Phone: (303) 470-0416
Fax: (303) 791-0140

Notes from the Meeting Between DFO-HMD and Bilcon of Nova Scotia November 2, 2004

In attendance: Paul Buxton - Project Manager, Bilcon
Dave Kearn - Environmental Consultant, Bilcon
Marci Penney-Ferguson - Section Head, DFO-HMD
Phil Zamora – Habitat Assessment Biologist, DFO-HMD

This meeting was requested by Bilcon to establish a working relationship with DFO in order that the fish and fish habitat provisions under the *Fisheries Act*, for the proposed Whites Point Quarry and Marine Terminal Project, may be discussed. The objective of the meeting was to identify the issues pertaining to fish and fish habitat, which have the potential to be affected by the project. Although the environmental impact statement (EIS) is not yet available, many of the issues are referred to in the Project Description and the EIS Guidelines. The following issues were identified:

HADD of fish habitat

A harmful alteration, disruption or destruction (HADD) of fish habitat is likely, as a result of construction of the proposed marine terminal. Therefore, Bilcon will be required to obtain a *Fisheries Act* (FA) subsection 35(2) Authorization from the DFO Minister before the project can proceed. The issuance of a FA subsection 35(2) Authorization cannot be considered until the current panel review process under the *Canadian Environmental Assessment Act* is completed. A suitable fish habitat compensation plan will also be required from Bilcon as an integral part of a FA subsection 35(2) Authorization.

An application for a FA subsection 35(2) Authorization was received from Bilcon on May 19, 2003. DFO will review the application to determine whether any amendments or updates are required.

There is also potential for a HADD of fish habitat to occur in the freshwater environment resulting from quarry excavation. Although the proposed excavation area does not include any fish bearing streams, the quarry could affect groundwater supplies to fish bearing streams that flow southward into Saint Mary's Bay. This question will be investigated by looking at hydrologic data collected by Bilcon. DFO will seek expert advice from Natural Resources Canada on this issue when information on groundwater test results is available.

Blasting

Proposed blasting at the Whites Point quarry will have the potential to cause harmful effects on fish and fish habitat. Since blasting is planned for near shore areas, there is concern that pressure waves have the potential to harm or kill finfish and marine mammals and that sound could harm marine mammals or disrupt their behavior.

DFO began a review of the blasting issue when Bilcon (then Nova Stone Inc) submitted a Blasting Plan in 2003. Technical and scientific information has been exchanged and the review is ongoing.

Species at Risk

There are at least two species at risk identified as potentially being effected by blasting operations. These are the inner Bay of Fundy (iBoF) Atlantic salmon and the North Atlantic right whale.

Information on potential harmful effects of blasting pressure waves on iBoF Atlantic salmon and safe set back distances have been provided to Bilcon as a result of DFO's review of the Blasting Plan previously submitted.

Review of the potential effects of blasting on the North Atlantic right whale is in progress. Technical information on time delays for the charge as well as on pressure and sound waves that will result from blasting is required in order to complete the review. Bilcon agreed to supply this information.

Bilcon raised the possibility of performing a test blast to measure the pressure waves and their effects on species at risk. DFO would only support a test blast if it were necessary in order to gain information that was not already available for determining safe levels for operation with respect to protecting fish and fish habitat. At this point in their review, DFO science has not concluded this to be the case.

These were identified as being the key issues. Other issues such as ballast water transfer and invasive species will be discussed as the EIS is developed. There was agreement to continue to meet again as needed.

Notes from the Meeting Between DFO-HMD and Bilcon of Nova Scotia December 10, 2004

In attendance: Paul Buxton - Project Manager, Bilcon
Dave Kearn - Environmental Consultant, Bilcon
Marci Penney-Ferguson - Section Head, DFO-HMD
Phil Zamora – Habitat Management Biologist, DFO-HMD
Thomas Wheaton - Area Habitat Coorinator – DFO
Brian Jollymore - Habitat Management Biologist, DFO-HMD
Peter Amiro - Diadromous Biologist – DFO Science
Carol Jacobi – Habitat Management Officer – DFO-HMD

This meeting was requested by Bilcon who asked that Thomas Wheaton be present to discuss habitat compensation, a DFO expert to discuss inner Bay of Fundy (iBoF) Atlantic salmon, and a DFO expert to discuss blasting.

iBoF Atlantic salmon

The proponent stated that because iBoF salmon have become an issue with respect to this project, they commissioned Mike Dadswell, from Acadia University, to do a study on the presence of this species in the Bay of Fundy. The consultants report indicates that based on historical data, iBoF salmon do not pass along the Bay of Fundy shoreline of Digby Neck. There have been no tags recovered and no fisheries in that area.

Peter Amiro, Diadromous Biologist with DFO Science, stated that because there has not been a fishery for salmon in that area, one would not expect to recover tags. DFO remains of the opinion that historic fishing, scientific sampling and theoretic modeling indicates that there could be migrating iBoF Atlantic salmon in the Whites Point, Digby Neck area from May until October.

Because they are listed as endangered by the Species at Risk Act (SARA), the disruption or killing of iBoF Atlantic salmon are prohibited. DFO will work with the proponent to guide them in their desire to mitigate the potential harmful effects of their operation on this species.

Blasting

The proponent's original blasting plan was for the toe of the quarry, this area is closest to the water and will give them a working platform. The working face will be a couple of hundred meters back from the water. As they move away from the water they will increase the size of the charge. The original blasting plan was within the guidelines. The guidelines were formulated before SARA became an issue. Under SARA the loss of

a single individual iBoF Atlantic Salmon would be prohibited, so for the proposed size of the blast, distances were increased by 3 times the guideline calculated set back distance, extending the necessary protection afforded to fish. DFO's calculations used site specific information and were based on smaller, stacked charges and a charge delay timeline of 25 milliseconds. The proponent stated that the charge delay timeline of 25 milliseconds, used for the guideline calculation, was too long. If they used it to satisfy DFO guideline calculation it would create Health and Safety problems. The Proponent requested access to the model DFO is using so they can recalculate for each blast. The model used by DFO is described in the document entitled "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters" - 1998.

Adaptive management was discussed as a possible approach to the blasting issue. DFO suggested that if the potential effects from blasting could be modelled and if the model predicted that the effects would not be harmful to fish (including SARA species) and fish habitat, then any initial blast could be monitored to confirm the predictions and subsequent blasts could be adapted according to monitoring results.

The proponent has suggested mitigation measures to deal with the effects of using ANFO (ammonium nitrate-fuel oil) based explosives. DFO will review these measures for effectiveness and advise the proponent.

Species at Risk

The proponent stated that although their original blasting plan contained mitigation it did not address SARA species. They have revised it by increasing distances and would like someone to review it to see if it is sufficient to protect SARA species.

Invasive Species

The proponent inquired about ballast water discharge guidelines and the invasive species issue. DFO does have experts in the invasive species field that would be able to review information provided on this issue. However, Transport Canada regulates ballast water discharge.

Other Questions

The Proponent asked for a clarification of a statement on page 14 of the 'Draft Guidelines for the Preparation of the Environmental Impact Statement for the Whites Point Quarry and Marine Terminal Project – November 2004'. The statement reads 'The Proponent is not required to generate new stock assessments for species other than

fish in affected aquatic environments, but it must include all available historical data on population stocks and status'.
DFO will review the statement and, if necessary, suggest appropriate changes DFO would recommend as clarification. This would likely be done in DFO's response to a request from the Review Panel for comments on the Draft EIS Guidelines.

The Proponent asked if there were any freshwater fish or fish habitat concerns with respect to this project. DFO stated that affects on the ground water supply could affect the Little River watershed and that a fluctuation in base flow to Little River could be a habitat concern. Although there will be no active quarrying in the Little River Watershed, it is necessary to know the ground water flow contributing to the system. A groundwater study should reveal information on this potential effect, and mitigation is available. Natural Resources Canada has expertise in this area.

The Proponent expressed a desire for a co-operative approach to the collecting of information needed for an environmental impact statement, for example DFO could monitor a test blast to give verification to the modelling of predicted effects from blasting. DFO stated that they are interested in a co-operative approach as well. However, with respect to a test blast, DFO will not support one unless they felt a test blast was necessary to help answer uncertainties that needed to be answered in order to protect fish and fish habitat, including marine mammals and species at risk. At present, DFO has not determined a test blast to be necessary.

Notes from the Meeting Between DFO-HMD and Bilcon of Nova Scotia February 7, 2005

In attendance: Paul Buxton - Project Manager, Bilcon
Dave Kearn - Environmental Consultant, Bilcon
Marci Penney-Ferguson - Section Head, DFO-HMD
Phil Zamora – Habitat Management Biologist, DFO-HMD
Thomas Wheaton - Area Habitat Coordinator – DFO
Brian Jollymore - Habitat Management Biologist, DFO-HMD

This meeting was scheduled as a follow-up to the December 10, 2004 meeting.

HADD of fish habitat

The Proponent stated that they had made the appropriate minor changes on the application for a HADD authorization (company name, addition of Transport Canada as the new department for NWP, and a revision of start/end dates). There are no changes in plans from their earlier submission of the application in 2003.

Bilcon wishes to work cooperatively with DFO to achieve a fish habitat compensation plan that will satisfy DFO's Policy for the Management of Fish Habitat and benefit the community. They will be looking to DFO for guidance. DFO stated that the, although the plan needs to meet the approval of DFO, its development and implementation is the responsibility of the proponent. DFO will provide guidance.

Blasting

DFO provided the proponent with a paper entitled "Practical Methods to Reduce Ammonia and Nitrate Levels in Mine Water" by Gordon F. Revey on mitigation measures for the use of ANFO (ammonium nitrate-fuel oil) based explosives. DFO's explosives expert has said that if the mitigation that has been proposed by the proponent and the recommendations outlined in the paper by Gordon Revey were incorporated into the blasting plan, there will be little in the way of residual impacts accruing from this aspect of the proposal.

Notes from the Meeting Between DFO-HMD and Bilcon of Nova Scotia May 5, 2005

In attendance: Paul Buxton - Project Manager, Bilcon
Dave Kearn - Environmental Consultant, Bilcon
Andree Leveille - Bilcon
Marci Penney-Ferguson - Section Head, DFO-HMD
Phil Zamora – Habitat Management Biologist, DFO-HMD
Thomas Wheaton - Area Habitat Coordinator – DFO
Brian Jollymore - Habitat Management Biologist, DFO-HMD

HADD of fish habitat

DFO has reviewed the first draft of the habitat compensation plan submitted by Bilcon. The proponent is proposing the installation of artificial lobster shelters designed by Jacques Whitford consultants that have been used in the recent past in other marine compensation plans.

The enhancement structures, although predominantly designed to enhance lobsters, have been known to enhance other species important to the area as well. The proponent also plans to locate the structures in the vicinity of the terminal location. Since the area of potential HADD is very productive for lobster, the first preference in the hierarchy of preferences for achieving no net loss of productive capacity would be satisfied by this compensation plan. However, DFO identified a few deficiencies in the draft plan, including the absence of effectiveness and compliance monitoring.

There was a discussion concerning the potential for the marine terminal to block light penetration to the ocean bottom flora and fauna underneath. Although the marine terminal is expected to occupy a 10 acre area, based on current information it is likely only a small portion would interfere with light penetration, which is the portion consisting of the marine terminal deck, bent and mooring dolphins. As currently designed, light is not completely blocked even by these structures because they are suspended above the water with piles.

DFO also suggested the proponent contact the local fishers in the area to coordinate the best possible locations for the artificial lobster structures. Transport Canada's Navigable Waters Program should also be contacted to determine whether the structures are a navigation concern.

Blasting

DFO had some questions regarding sound levels in the marine environment as a result of blasting operations which have been predicted by the model used by JASCO consultants. Bilcon will provide to DFO the JASCO's submission which includes the modelling done to calculate these predictions.

Invasive Species

The proponent expressed concern about complying with guidelines for invasive species. Vessels could be compelled to comply with regulations, but they can't be forced to comply with guidelines. Also if a vessel is traveling between Digby and the US they may not be anywhere near the designated dump zone. DFO stated that Transport Canada, who is also a Responsible Authority for this project, would likely have some guidance on this issue.

Notes from the Meeting Between DFO-HMD and Bilcon of Nova Scotia July 29, 2005

In attendance: Paul Buxton - Project Manager, Bilcon
Dave Kearn - Consultant, Bilcon
John Wall – Mineral Assets Manager, Clayton
Heidi Schaefer - SARA Biologist, DFO-HMD
Marci Penney-Ferguson - Section Head, DFO-HMD
Ted Potter – EA and Major Projects Division Manager
Phil Zamora – Habitat Management Biologist, DFO-HMD
Thomas Wheaton - Area Habitat Coordinator– DFO
Brian Jollymore - Habitat Management Biologist, DFO-HMD

HADD of fish habitat

DFO has reviewed the second draft of the habitat compensation plan submitted by Bilcon. The proponent is proposing the installation of artificial lobster shelters designed by Jacques Whitford consultants that have been used in the recent past in other marine compensation plans.

DFO acknowledged that the proponent had included a conceptual monitoring strategy within the plan to assess effectiveness and compliance. However, DFO will need to review the details of the monitoring when they become available.

DFO supports the proponent's proposal to construct marine growth enhancement structures along the piles in order to compensate for the water column portion of the HADD.

An application has been submitted by the proponent to the Navigable Waters Protection Program with Transport Canada for the habitat compensation structures.

Blasting

DFO has reviewed the paper provided by JASCO in light of the current expert advice provided by DFO. DFO Regional Advisory Process office has been asked to formulate a Science Expert Opinion document regarding the potential effects of sound from blasting at the proposed Whites Point Quarry on marine mammals in the Bay of Fundy.

Bilcon expressed an interest to help enhance the knowledge base for this issue. They are very interested in the establishment of a threshold for them to work with, not only for

the North Atlantic right whale but also for iBoF Atlantic salmon. DFO maintains that the issue of the sound effects on behaviour are not well understood and that is why they have asked for a review, specifically, of this concern.

Notes from the Meeting Between DFO and Bilcon of Nova Scotia October 28, 2005

In attendance: Paul Buxton - Project Manager, Bilcon
Dave Kearn - Environmental Consultant, Bilcon
Scott Clark, JASCO Research Ltd., Bilcon Consultant
Marci Penney-Ferguson – Section Head, DFO-HMD
Phil Zamora – Habitat Management Biologist, DFO
Thomas Wheaton - Area Habitat Coordinator , DFO
Brian Jollymore – Habitat Assessment Biologist, DFO-HMD
Mark McLean – Senior Environmental Analyst, DFO
Tana Worcester – Regional Advisory Process Coordinator, DFO
Norman Cochrane – Research Scientist, DFO

Bilcon stated that they have informed the review panel they would file their Environmental Impact Statement on December 15, 2005. As part of this meeting Bilcon is seeking advice from DFO on the Blasting Plan, specifically they are looking for input related to thresholds, monitoring and fish habitat compensation.

Shipping

Bilcon also asked how far beyond the terminal would they have to look at shipping impacts. DFO stated that scope of the project is set by the panel and any questions regarding scope of project should be directed to the panel. Bilcon indicated that they are including an analysis of the area between the main shipping line and the terminal in their EIS.

Fish Habitat Compensation

DFO has reviewed the proposed fish habitat compensation plan submitted by Bilcon. Based on the preliminary information provided to date, DFO is satisfied that the components of this proposed habitat compensation plan would meet the requirements and objectives of the Policy for the Management of Fish Habitat under the Policy for the Management of Fish Habitat. DFO stated that it would be sending a letter to Bilcon on its review of the compensation plan. However, Bilcon was reminded that the issuance of a *Fisheries Act* Section 35 (2) Authorization and any subsequent fish habitat compensation plan can only be determined after consideration of the Joint Panel report issued at the conclusion of the environmental assessment.

Blasting

There was a discussion on whether more information could be provided for the blasting model to address the uncertainty. It was noted that the inherent limitations within the model itself account for much of the uncertainty and therefore additional information would not address this uncertainty.

DFO gave a presentation which outlined the approach that is being taken for the analysis the Blasting Plan and some of the initial conclusions that will be provided more fully in DFO's final comments on the Blasting Plan. DFO indicated that it is waiting on some additional information before finalizing its comments on the Blasting Plan. The comments would be sent to Bilcon once they are finalized.

There was a discussion on the definition of significance. DFO will not be providing a definition of significance in the science advice provided to Bilcon. DFO may provide information with regard to significance during the panel review but it would be the panel who will define significance.