

Petitioner's Exhibit 21

Petitioner's Exhibit 21 consists of two spreadsheets provided to Petitioner by EPA. In addition to the paper copy included herein, an electronic version of these Excel spreadsheets has been provided on CD.

2007 Kulluk Beaufort Sea Air Emissions Time Line

Comments

- 1 OCS blocks are most likely, Ice conditions could force the drilling of OCS-Y 6824 location (11.5 miles) instead of OCS-Y block 6658.
- 2 Anchor winches and the cementing unit are powered by prime movers
- 3 Mob, DeMob, Moving to next location, is considered only when the vessel enters the 25 mile radius of impact for each well location.
- 4 After tow, move, the icebreaker Vladimir Ignatuk will range upstream of the rig and perform ice management, but likely in the 25 mile radius.
- 5 After tow, move, and running/retrieving anchors, the AHSV Fennica or Tor Viking will range upstream of the rig and perform ice management
- 6 Thrustmaster engines run during final move onto location and for 2 hour thereafter during anchoring
- 7 While anchoring, the Vladimir Ignatuk will help the rig maintain position until four anchors are set (8 hours)
- 8 Equipment noted as Electric in the Units column, are powered by the rig or other emissions devices and are therefore not emissions sources
- 9 The Kulluk tows at 3 knots/hour, therefore it takes 8 hours to transit the 25 mile radius of impact while moving on the location
- 10 While towing the Kulluk, the Fennica or Tor Viking will be loaded equivalent to working in heavy ice conditions
- 11 Ice Management vessel emissions based on average engine loads for average season conditions based on season conditions over the last 3
- 12 The Jim Kilabuk will resupply each Kulluk an estimated once every other week. The vessel In Transit emissions are included only during the ti
- 13 The Kilabuk will transit at 12 knots, the mob/demob time is therefore roughly 2 hours
- 14 Numbers in red for VI are changes as a result of late input from Murmansk Shipping

Time Line

Activity	Loc 1 of 4				
	Mob Kulluk to in 25 mile Radius	Run Anchors	Drill MLC 1	Drill 36" Hole, Install 30"	Drill Pilot Hole, OH, Install 20" at 1000 ft
OCS Block	NA	OCS-Y 6708	OCS-Y 6708	OCS-Y 6708	OCS-Y 6708
Distance to Shoreline (miles)	NA	15.8	15.8	15.8	15.8
Days	0.3	1.0	7.1	1.4	3.7
Cumulative Days	0.3	1.3	8.4	9.7	13.4
Date	8/1/2007	8/2/2007	8/9/2007	8/10/2007	8/14/2007

Emissions Source (Values are in 24-hour Days)

KULLUK RIG	Rating	Units					
Main Engine>600hp diesel	2816	BHP	0.3	1.0	7.1	1.4	3.7
Main Engine>600hp diesel	2816	BHP	0.1	0.2	2.8	0.5	1.5
Main Engine>600hp diesel	2816	BHP					
Emergency Generator	630	Kw					

Air Compressor, Tier III	500	BHP			1.0	1.4		
Air Compressor, Tier III	500	BHP			1.0			
Air Compressor, Tier III	500	BHP						
HPP Engine<600 hp diesel	250	BHP			1.0			
HPP Engine<600 hp diesel	250	BHP			1.0			
Deck Crane	259	Kw	0.1	0.3	2.4	0.5	1.2	
Deck Crane	259	Kw	0.0	0.1	0.9	0.2	0.5	
Deck Crane	259	Kw	0.0	0.1	0.9	0.2	0.5	
Thrustmaster diesel, Cat 3516 B	2000	BHP		0.1				
Thrustmaster diesel, Cat 3516 B	2000	BHP		0.1				
Anchor Winches	NA	Electric		NA	NA	NA	NA	NA
Cementing Unit	NA	Electric		NA	NA	NA	NA	NA
Logging Diesel Winch	140	BHP						0.3
Logging Backup Winch Detroit 471 Diesel	120	BHP						
Heat Boiler	2.4	MMBTUh	0.3	1.0	7.1	1.4	3.7	
Heat Boiler	2.4	MMBTUh						
Hot Water Heat	0.54	MMBTUh	0.1	0.3	2.3	0.4	1.2	
Hot Water Heat	0.54	MMBTUh						
Incinerator	400	lb/hr						
VLADIMIR IGNATJUK								
Main Engine	5800	BHP	0.2	0.7	4.7	0.9	2.5	
Main Engine	5800	BHP	0.2	0.7	4.7	0.9	2.5	
Main Engine	5800	BHP	0.0	0.1	0.7	0.1	0.4	
Main Engine	5800	BHP	0.0	0.1	0.7	0.1	0.4	
Generator	980	Kw	0.2	0.6	4.1	0.8	2.1	
Generator	980	Kw	0.0	0.0	0.0	0.0	0.0	
Emergency Generator	200	Kw	0.0	0.0	0.0	0.0	0.0	
Heat Boiler	2.4	MMBTUh	0.1	0.5	3.2	0.6	1.7	
Hot Water Heat	0.54	MMBTUh	0.3	1.0	7.1	1.4	3.7	
Incinerator	65	lb/hr	0.0	0.0	0.0	0.0	0.0	
FENNICA (2008-2009)								
Main Engine	6000	KW	0.2	0.2	1.7	0.3	0.9	
Main Engine	6000	KW	0.2	0.3	2.0	0.4	1.0	
Main Engine	4500	KW	0.2	0.4	2.9	0.5	1.5	
Main Engine	4500	KW	0.2	0.3	2.0	0.4	1.0	

Auxilliary Engine	710	HP		0.0	0.0	0.0	0.0
Emergency Generator	300	HP		0.0	0.0	0.0	0.0
Heat Boiler	1300	KW	0.2	0.5	3.5	0.7	1.9
Heat Boiler	1300	KW	0.2	0.2	1.7	0.3	0.9
Incinerator	Unknown	Unknown					
TOR VIKING II (2007 Only)							
Main Engine/Generator	3840	kW	0.3	0.3	1.8	0.4	1.0
Main Engine/Generator	3840	kW	0.3	0.3	2.1	0.4	1.1
Main Engine/Generator	2880	kW	0.3	0.4	3.0	0.6	1.6
Main Engine/Generator	2880	kW	0.3	0.3	2.1	0.4	1.1
Harbour generator	800	kW	0.2	0.2	1.3	0.3	0.7
Emergency Generator	174	kW					
Heat Boiler	400	kW	0.2	0.5	3.5	0.7	1.9
Incinerator	Unknown	Unknown					
JIM KILABUK (Used primarily for resupply of Discoverer and Kulluk)							
Main Engine, Diesel V20 645 EMD	3600	BHP	0.0	0.1	0.0		
Main Engine, Diesel V20 645 EMD	3600	BHP	0.0	0.1	0.0		
Generator, Diesel Cat D3406	200	KW	0.0	0.4	0.0		
Generator, Diesel Cat D3406	200	KW					
HPP, Diesel Cat D343	300	BHP					
Bow Thruster Diesel Cat D343	300	BHP	0.0	0.1	0.0		

Associated Fuel Usage (m3)

KULLUK	2007	2008&2009	3.6	20.0	141.7	27.1	74.0
VLADIMIR IGNATJUK	2007	2008&2009	12.7	42.2	298.9	57.1	156.1
VIKING	2007		23.5	24.3	172.1	32.9	89.9
JIM KILABUK	2007	2008&2009	1.1	4.5	1.1		
FENNICA		2008&2009	29.6	38.4	272.0	52.0	142.1

2007 Total	40.8	91.0	613.8	117.1	320.1
2008-2009 Yearly Total	47.0	105.1	713.7	136.2	372.2

	Vessel	Fuel Consumption	
		Average m3/Day	Towing/Transit m3/Day
	Kulluk	20	12
	Discoverer	20.7	30.4
	Vladimer Igna	42.2	NA
t, likely in the 25 mile radius	Kapitan Drani	58.7	NA
	Nordica	38.4	98.7
	Fennica	38.4	98.7
	Viking	24.3	78.2
	Jim Kilabuk	4.5	12.5

years for a P50 (60 day) season
time it is in the 25 mile radius of impact. The vessel will be tied up to the rig and unload (Standby) in 24 hours, then demob out of the area.

					Loc total	Loc 2 of 4				
Drill 17 1/2" Hole, Install 13 3/8" at 2650 ft	Drill to TD, at 8000 ft	Evaluate, P&A	Shut Down for Whaling Season	Retrieve Anchors		Move to next Location	Run Anchors	Drill MLC 2	Install 30"	
OCS-Y 6708	OCS-Y 6708	OCS-Y 6708	OCS-Y 6709	OCS-Y 6708		NA	OCS-Y 6658	OCS-Y 6658	OCS-Y 6658	
15.8	15.8	15.8	15.8	15.8		NA	13	13	13	
4.1	2.1	4.2	14.0	1.0	38.8	0.6	1.0	7.1	1.4	
17.5	19.6	23.8	37.8	38.8		39.4	40.4	47.5	48.9	
8/18/2007	8/20/2007	8/24/2007	9/7/2007	9/8/2007		9/9/2007	9/10/2007	9/17/2007	9/18/2007	
					38.84					
4.1	2.1	4.2	7.0	1.0	31.8	0.6	1.0	7.1	1.4	
1.6	0.8	1.7	0.0	0.2	9.5	0.1	0.2	2.8	0.5	
					0.0					
					0.0					

					2.4			1.0	1.4
					1.0			1.0	
					0.0				
					1.0			1.0	
					1.0			1.0	
1.4	0.7	1.4		0.3	8.3	0.2	0.3	2.4	0.5
0.5	0.3	0.5		0.1	3.1	0.1	0.1	0.9	0.2
0.5	0.3	0.5		0.1	3.1	0.1	0.1	0.9	0.2
					0.1		0.1		
					0.1		0.1		
NA	NA	NA	NA	NA	0.0		NA	NA	NA
NA	NA	NA	NA	NA	0.0		NA	NA	NA
0.3		1.5			2.0				
					0.0				
4.1	2.1	4.2	14.0	1.0	38.8	0.6	1.0	7.1	1.4
					0.0				
1.4	0.7	1.4	4.6	0.3	12.8	0.2	0.3	2.3	0.4
					0.0				
					0.0				
2.7	1.4	2.8	9.4	0.7	26.0	0.4	0.7	4.7	0.9
2.7	1.4	2.8	9.4	0.7	26.0	0.4	0.7	4.7	0.9
0.4	0.2	0.4	1.5	0.1	4.1	0.1	0.1	0.7	0.1
0.4	0.2	0.4	1.5	0.1	4.1	0.1	0.1	0.7	0.1
2.4	1.2	2.4	8.1	0.6	22.4	0.3	0.6	4.1	0.8
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.9	1.0	1.9	6.3	0.5	17.6	0.3	0.5	3.2	0.6
4.1	2.1	4.2	14.0	1.0	38.8	0.6	1.0	7.1	1.4
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0	0.5	1.0	3.4	0.2	9.6	0.5	0.2	1.7	0.3
1.2	0.6	1.2	3.9	0.3	11.1	0.5	0.3	2.0	0.4
1.7	0.9	1.7	5.7	0.4	15.8	0.5	0.4	2.9	0.5
1.2	0.6	1.2	3.9	0.3	11.1	0.5	0.3	2.0	0.4

0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
2.1	1.1	2.1	7.0	0.5	19.4	0.3	0.5	3.5	0.7
1.0	0.5	1.0	3.3	0.2	9.3	0.5	0.2	1.7	0.3
					0.0				

1.1	0.5	1.1	3.6	0.3	10.3	0.5	0.3	1.8	0.4
1.2	0.6	1.2	4.1	0.3	11.7	0.5	0.3	2.1	0.4
1.7	0.9	1.8	5.9	0.4	16.5	0.5	0.4	3.0	0.6
1.2	0.6	1.2	4.1	0.3	11.7	0.5	0.3	2.1	0.4
0.8	0.4	0.8	2.7	0.2	7.5	0.3	0.2	1.3	0.3
					0.0				
2.1	1.1	2.1	7.0	0.5	19.4	0.3	0.5	3.5	0.7
					0.0				

0.2			0.2		0.5			0.2	
0.2			0.2		0.5			0.2	
0.4			0.4		1.2			0.4	
					0.0				
					0.0				
0.2			0.2		0.5			0.2	

82.0	42.0	84.0	280.0	20.0	774.4	12.0	20.0	141.7	27.1
173.0	88.6	177.2	590.8	42.2	1638.9	25.3	42.2	298.9	57.1
99.6	51.0	102.1	340.2	24.3	959.9	46.9	24.3	172.1	32.9
6.7			6.7					6.7	
157.4	80.6	161.3	537.6	38.4	1509.5	59.2	38.4	272.0	52.0

361.3	181.7	363.3	1217.7	86.5	3393.2	84.2	86.5	619.4	117.1
419.1	211.3	422.5	1415.1	100.6	3942.8	96.5	100.6	719.3	136.2

Loc total						Loc 3 of 4			
Drill Pilot Hole, OH, Install 20" at 1000 ft	Drill 17 1/2" Hole, Install 13 3/8" at 2650 ft	Drill to 12 1/4", install 9 5/8" at 8000 ft	Drill 8 1/2" Hole to TD at 11400 ft	Evaluate, P&A	Retrieve Anchors		Move to next Location	Run Anchors	Drill MLC 3
OCS-Y 6658	OCS-Y 6658	OCS-Y 6658	OCS-Y 6658	OCS-Y 6658	OCS-Y 6658		OCS-Y TBD	OCS-Y TBD	OCS-Y TBD
13	13	13			13		13	13	13
3.7	4.1	14.7	4.9	5.0	1.0	43.4	0.6	1.0	7.1
52.6	56.7	71.4	76.3	81.3	82.3		82.9	83.9	91.0
9/22/2007	9/26/2007	10/11/2007	10/15/2007	10/20/2007	10/21/2007		10/22/2007	10/23/2007	10/30/2007
						43.44			
3.7	4.1	14.7	4.9	5.0	1.0	43.4	0.6	1.0	7.1
1.5	1.6	5.9	2.0	2.0	0.2	16.9	0.1	0.2	2.8
						0.0			
						0.0			

						2.4			1.0
						1.0			1.0
						0.0			
						1.0			1.0
						1.0			1.0
1.2	1.4	4.9	1.6	1.7	0.3	14.5	0.2	0.3	2.4
0.5	0.5	1.8	0.6	0.6	0.1	5.4	0.1	0.1	0.9
0.5	0.5	1.8	0.6	0.6	0.1	5.4	0.1	0.1	0.9
						0.1		0.1	
						0.1		0.1	
NA	NA	NA	NA	NA	NA	0.0		NA	NA
NA	NA	NA	NA	NA	NA	0.0		NA	NA
0.3	0.3	1.5		1.5		3.5			
						0.0			
3.7	4.1	14.7	4.9	5.0	1.0	43.4	0.6	1.0	7.1
						0.0			
1.2	1.4	4.9	1.6	1.7	0.3	14.3	0.2	0.3	2.3
						0.0			
						0.0			
2.5	2.7	9.8	3.3	3.3	0.7	29.1	0.4	0.7	4.7
2.5	2.7	9.8	3.3	3.3	0.7	29.1	0.4	0.7	4.7
0.4	0.4	1.5	0.5	0.5	0.1	4.6	0.1	0.1	0.7
0.4	0.4	1.5	0.5	0.5	0.1	4.6	0.1	0.1	0.7
2.1	2.4	8.5	2.8	2.9	0.6	25.1	0.3	0.6	4.1
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.7	1.9	6.7	2.2	2.3	0.5	19.7	0.3	0.5	3.2
3.7	4.1	14.7	4.9	5.0	1.0	43.4	0.6	1.0	7.1
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.9	1.0	3.6	1.2	1.2	0.2	10.9	0.5	0.2	1.7
1.0	1.2	4.1	1.4	1.4	0.3	12.5	0.5	0.3	2.0
1.5	1.7	6.0	2.0	2.0	0.4	17.8	0.5	0.4	2.9
1.0	1.2	4.1	1.4	1.4	0.3	12.5	0.5	0.3	2.0

0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
1.9	2.1	7.4	2.5	2.5	0.5	21.7	0.3	0.5	3.5
0.9	1.0	3.5	1.2	1.2	0.2	10.5	0.5	0.2	1.7
						0.0			

1.0	1.1	3.8	1.3	1.3	0.3	11.6	0.5	0.3	1.8
1.1	1.2	4.4	1.5	1.5	0.3	13.2	0.5	0.3	2.1
1.6	1.7	6.2	2.1	2.1	0.4	18.5	0.5	0.4	3.0
1.1	1.2	4.4	1.5	1.5	0.3	13.2	0.5	0.3	2.1
0.7	0.8	2.8	0.9	1.0	0.2	8.4	0.3	0.2	1.3
						0.0			
1.9	2.1	7.4	2.5	2.5	0.5	21.7	0.3	0.5	3.5
						0.0			

	0.2		0.2			0.5			0.2
	0.2		0.2			0.5			0.2
	0.4		0.4			1.2			0.4
						0.0			
						0.0			
	0.2		0.2			0.5			0.2

74.0	82.0	294.0	98.0	100.0	20.0	868.8	12.0	20.0	141.7
156.1	173.0	620.3	206.8	211.0	42.2	1833.1	25.3	42.2	298.9
89.9	99.6	357.2	119.1	121.5	24.3	1087.9	46.9	24.3	172.1
	6.7		6.7			20.0			6.7
142.1	157.4	564.5	188.2	192.0	38.4	1704.2	59.2	38.4	272.0

320.1	361.3	1271.6	430.5	432.5	86.5	3809.7	84.2	86.5	619.4
372.2	419.1	1478.8	499.6	503.0	100.6	4426.0	96.5	100.6	719.3

						Loc total	Loc 4 of 4			
Install 30"	Drill Pilot Hole, OH, Install 20" at 1000 ft	Drill 17 1/2" Hole, Install 13 3/8" at 2650 ft	Drill to TD, at 8000 ft	Evaluate, P&A	Retrieve Anchors		Move to next Location	Run Anchors	Drill MLC 4	Install 30"
OCS-Y TBD	OCS-Y TBD	OCS-Y TBD	OCS-Y TBD	OCS-Y TBD	OCS-Y TBD		OCS-Y TBD	OCS-Y TBD	OCS-Y TBD	OCS-Y TBD
13	15.8	15.8	15.8	15.8	13		13	13	13	13
1.4	3.7	4.1	2.1	4.2	1.0	25.1	0.6	1.0	7.1	1.4
92.3	96.0	100.1	102.2	106.4	107.4		108.0	109.0	116.1	117.5
11/1/2007	11/4/2007	11/8/2007	11/10/2007	11/15/2007	11/16/2007		11/16/2007	11/17/2007	11/24/2007	11/26/2007
						25.1				
1.4	3.7	4.1	2.1	4.2	1.0	25.1	0.6	1.0	7.1	1.4
0.7	1.5	1.6	0.8	1.7	0.2	9.7	0.1	0.2	2.8	0.7
						0.0				
						0.0				

1.4						2.4			1.0	1.4
						1.0			1.0	
						0.0				
						1.0			1.0	
						1.0			1.0	
0.5	1.2	1.4	0.7	1.4	0.3	8.4	0.2	0.3	2.4	0.5
0.2	0.5	0.5	0.3	0.5	0.1	3.1	0.1	0.1	0.9	0.2
0.2	0.5	0.5	0.3	0.5	0.1	3.1	0.1	0.1	0.9	0.2
						0.1		0.1		
						0.1		0.1		
NA	NA	NA	NA	NA	NA	0.0		NA	NA	NA
NA	NA	NA	NA	NA	NA	0.0		NA	NA	NA
	0.3	0.3		1.5		2.0				
						0.0				
1.4	3.7	4.1	2.1	4.2	1.0	25.1	0.6	1.0	7.1	1.4
						0.0				
0.4	1.2	1.4	0.7	1.4	0.3	8.3	0.2	0.3	2.3	0.4
						0.0				
						0.0				
0.9	2.5	2.7	1.4	2.8	0.7	16.8	0.4	0.7	4.7	0.9
0.9	2.5	2.7	1.4	2.8	0.7	16.8	0.4	0.7	4.7	0.9
0.1	0.4	0.4	0.2	0.4	0.1	2.6	0.1	0.1	0.7	0.1
0.1	0.4	0.4	0.2	0.4	0.1	2.6	0.1	0.1	0.7	0.1
0.8	2.1	2.4	1.2	2.4	0.6	14.5	0.3	0.6	4.1	0.8
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.6	1.7	1.9	1.0	1.9	0.5	11.4	0.3	0.5	3.2	0.6
1.4	3.7	4.1	2.1	4.2	1.0	25.1	0.6	1.0	7.1	1.4
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.3	0.9	1.0	0.5	1.0	0.2	6.5	0.5	0.2	1.7	0.3
0.4	1.0	1.2	0.6	1.2	0.3	7.4	0.5	0.3	2.0	0.4
0.5	1.5	1.7	0.9	1.7	0.4	10.4	0.5	0.4	2.9	0.5
0.4	1.0	1.2	0.6	1.2	0.3	7.4	0.5	0.3	2.0	0.4

0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
0.7	1.9	2.1	1.1	2.1	0.5	12.6	0.3	0.5	3.5	0.7
0.3	0.9	1.0	0.5	1.0	0.2	6.2	0.5	0.2	1.7	0.3
						0.0				

0.4	1.0	1.1	0.5	1.1	0.3	6.9	0.5	0.3	1.8	0.4
0.4	1.1	1.2	0.6	1.2	0.3	7.8	0.5	0.3	2.1	0.4
0.6	1.6	1.7	0.9	1.8	0.4	10.8	0.5	0.4	3.0	0.6
0.4	1.1	1.2	0.6	1.2	0.3	7.8	0.5	0.3	2.1	0.4
0.3	0.7	0.8	0.4	0.8	0.2	5.0	0.3	0.2	1.3	0.3
						0.0				
0.7	1.9	2.1	1.1	2.1	0.5	12.6	0.3	0.5	3.5	0.7
						0.0				

0.2	0.3
0.2	0.3
0.4	0.8
	0.0
	0.0
0.2	0.3

27.1	74.0	82.0	42.0	84.0	20.0	502.8	12.0	20.0	141.7	27.1
57.1	156.1	173.0	88.6	177.2	42.2	1060.8	25.3	42.2	298.9	57.1
32.9	89.9	99.6	51.0	102.1	24.3	643.2	46.9	24.3	172.1	32.9
				6.7		13.3				
52.0	142.1	157.4	80.6	161.3	38.4	1001.5	59.2	38.4	272.0	52.0

117.1	320.1	354.7	181.7	370.0	86.5	2220.1	84.2	86.5	612.7	117.1
136.2	372.2	412.5	211.3	429.2	100.6	2578.4	96.5	100.6	712.6	136.2

		Loc total	Season Total
Retrieve Anchors	Demob Kulluk out of 25 mile radius		
OCS-Y TBD	NA		
13	NA		
1.0	0.3	11.3	118.8
118.5	118.8		
11/27/2007	#####		
		11.3	118.8
1.0	0.3	11.3	111.8
0.2	0.1	4.1	40.1
		0.0	0.0
		0.0	0.0

Combined location 2 and 3					
Loc 2					
Move to next Location	Run Anchors OCS-Y	Drill MLC 2 OCS-Y	Install 30" OCS-Y	Drill Pilot Hole, OH, Install 20" at 1000 ft OCS-Y	
NA	6658	6658	6658	6658	6658
NA	13	13	13	13	13
0.6	1.0	7.1	1.4	3.7	
0	0.6	1.6	8.7	10.0	13.7
9/8/2007	9/8/2007	9/9/2007	9/16/2007	9/18/2007	9/21/2007
All values below are linked to the timeline cells.					
0.6	1.0	7.1	1.4	3.7	
0.1	0.2	2.8	0.5	1.5	
0	0.0	0.0	0.0	0.0	0.0
0.00	0.0	0.0	0.0	0.0	0.0

		2.4	9.4	0.00	0.0	1.0	1.4	0.0
		1.0	4.0	0.00	0.0	1.0	0.0	0.0
		0.0	0.0	0.00	0.0	0.0	0.0	0.0
		1.0	4.0	0.00	0.0	1.0	0.0	0.0
		1.0	4.0	0.00	0.0	1.0	0.0	0.0
0.3	0.1	3.8	34.9	0.2	0.3	2.4	0.5	1.2
0.1	0.0	1.4	13.1	0.1	0.1	0.9	0.2	0.5
0.1	0.0	1.4	13.1	0.1	0.1	0.9	0.2	0.5
		0.1	0.3	0.00	0.1	0.0	0.0	0.0
		0.1	0.3	0	0.1	0.0	0.0	0.0
NA		0.0	0.0	0	NA	NA	NA	NA
NA		0.0	0.0	0	NA	NA	NA	NA
		0.0	7.5	0	0.0	0.0	0.0	0.3
		0.0	0.0	0	0.0	0.0	0.0	0.0
1.0	0.3	11.3	118.8	0.6	1.0	7.1	1.4	3.7
		0.0	0.0	0	0.0	0.0	0.0	0.0
0.3	0.1	3.7	39.2	0.2	0.3	2.3	0.4	1.2
		0.0	0.0	0	0.0	0.0	0.0	0.0
		0.0	0.0	0	0.0	0.0	0.0	0.0
		7.6	79.4	0.4	0.7	4.7	0.9	2.5
0.7	0.2	7.6	79.4	0.4	0.7	4.7	0.9	2.5
0.1	0.0	1.2	12.5	0.1	0.1	0.7	0.1	0.4
0.1	0.0	1.2	12.5	0.1	0.1	0.7	0.1	0.4
0.6	0.2	6.5	68.5	0.3	0.6	4.1	0.8	2.1
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.1	5.1	53.8	0.3	0.5	3.2	0.6	1.7
1.0	0.3	11.3	118.8	0.6	1.0	7.1	1.4	3.7
0.0	0.0	0.0	0.0	0	0	0	0	0
		3.3	30.3	0.5	0.2	1.7	0.3	0.9
0.2	0.2	3.7	34.6	0.5	0.3	2.0	0.4	1.0
0.3	0.2	4.9	49.0	0.5	0.4	2.9	0.5	1.5
0.4	0.2	3.7	34.6	0.5	0.3	2.0	0.4	1.0
0.3	0.2	3.7	34.6	0.5	0.3	2.0	0.4	1.0

0.0		0.0	0.0		0	0.0	0.0	0.0	0.0
0.0		0.0	0.0		0	0.0	0.0	0.0	0.0
0.5	0.2	5.7	59.4		0.3	0.5	3.5	0.7	1.9
0.2	0.2	3.2	29.3		0.5	0.2	1.7	0.3	0.9
		0.0	0.0		0	0.0	0.0	0.0	0.0
0.3	0.3	3.5	32.3		0.5	0.3	1.8	0.4	1.0
0.3	0.3	3.9	36.6		0.5	0.3	2.1	0.4	1.1
0.4	0.3	5.2	51.0		0.5	0.4	3.0	0.6	1.6
0.3	0.3	3.9	36.6		0.5	0.3	2.1	0.4	1.1
0.2	0.2	2.4	23.3		0.3	0.2	1.3	0.3	0.7
		0.0	0.0		0.0	0.0	0.0	0.0	0.0
0.5	0.2	5.7	59.4		0.3	0.5	3.5	0.7	1.9
		0.0	0.0		0.0	0.0	0.0	0.0	0.0
		0.0	1.3		0.0	0.0	0.2	0.0	0.0
		0.0	1.3		0.0	0.0	0.2	0.0	0.0
		0.0	3.3		0.0	0.0	0.4	0.0	0.0
		0.0	0.0		0.0	0.0	0.0	0.0	0.0
		0.0	0.0		0.0	0.0	0.0	0.0	0.0
		0.0	1.3		0.0	0.0	0.2	0.0	0.0
				264.17					
				gallons per cubic meter					
			Total	Total (gallons)					
20.0	6.0	226.8	2372.6	626,770	12.0	20.0	141.7	27.1	74.0
42.2	12.7	478.4	5011.3	1,323,822	25.3	42.2	298.9	57.1	156.1
24.3	23.5	324.0	3015.0	796,469	46.9	24.3	172.1	32.9	89.9
			53.4	14,096	0.0	0.0	6.7	0.0	0.0
38.4	29.6	489.6	4704.7	1,242,846	59.2	38.4	272.0	52.0	142.1

86.5	42.1	1029.2	10452.2	2,761,157	84.2	86.5	619.4	117.1	320.1
100.6	48.3	1194.8	12141.9	3,207,534	96.5	100.6	719.3	136.2	372.2

0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	3.7
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
1.4	4.9	1.6	1.7	0.5	1.2	1.4	0.7	1.4	0.3	19.6
0.5	1.8	0.6	0.6	0.2	0.5	0.5	0.3	0.5	0.1	7.4
0.5	1.8	0.6	0.6	0.2	0.5	0.5	0.3	0.5	0.1	7.4
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0
0.3	1.5	0.0	1.5	0.0	0.3	0.3	0.0	1.5	0.0	5.5
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.1	14.7	4.9	5.0	1.4	3.7	4.1	2.1	4.2	1.0	58.9
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.4	4.9	1.6	1.7	0.4	1.2	1.4	0.7	1.4	0.3	19.4
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

2.7	9.8	3.3	3.3	0.9	2.5	2.7	1.4	2.8	0.7	39.4
2.7	9.8	3.3	3.3	0.9	2.5	2.7	1.4	2.8	0.7	39.4
0.4	1.5	0.5	0.5	0.1	0.4	0.4	0.2	0.4	0.1	6.2
0.4	1.5	0.5	0.5	0.1	0.4	0.4	0.2	0.4	0.1	6.2
2.4	8.5	2.8	2.9	0.8	2.1	2.4	1.2	2.4	0.6	34.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.9	6.7	2.2	2.3	0.6	1.7	1.9	1.0	1.9	0.5	26.7
4.1	14.7	4.9	5.0	1.4	3.7	4.1	2.1	4.2	1.0	58.9
0	0	0	0	0	0	0	0	0	0	0.0

1.0	3.6	1.2	1.2	0.3	0.9	1.0	0.5	1.0	0.2	14.7
1.2	4.1	1.4	1.4	0.4	1.0	1.2	0.6	1.2	0.3	16.9
1.7	6.0	2.0	2.0	0.5	1.5	1.7	0.9	1.7	0.4	24.1
1.2	4.1	1.4	1.4	0.4	1.0	1.2	0.6	1.2	0.3	16.9

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.1	7.4	2.5	2.5	0.7	1.9	2.1	1.1	2.1	0.5	29.4
1.0	3.5	1.2	1.2	0.3	0.9	1.0	0.5	1.0	0.2	14.2
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.1	3.8	1.3	1.3	0.4	1.0	1.1	0.5	1.1	0.3	15.6
1.2	4.4	1.5	1.5	0.4	1.1	1.2	0.6	1.2	0.3	17.8
1.7	6.2	2.1	2.1	0.6	1.6	1.7	0.9	1.8	0.4	25.0
1.2	4.4	1.5	1.5	0.4	1.1	1.2	0.6	1.2	0.3	17.8
0.8	2.8	0.9	1.0	0.3	0.7	0.8	0.4	0.8	0.2	11.4
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.1	7.4	2.5	2.5	0.7	1.9	2.1	1.1	2.1	0.5	29.4
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.6
0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.6
0.4	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.4	0.0	1.6
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.6
82.0	294.0	98.0	100.0	27.1	74.0	82.0	42.0	84.0	20.0	1177.8
173.0	620.3	206.8	211.0	57.1	156.1	173.0	88.6	177.2	42.2	2485.2
99.6	357.2	119.1	121.5	32.9	89.9	99.6	51.0	102.1	24.3	1463.4
6.7	0.0	6.7	0.0	0.0	0.0	0.0	0.0	6.7	0.0	26.7
157.4	564.5	188.2	192.0	52.0	142.1	157.4	80.6	161.3	38.4	2297.6

361.3	1271.6	430.5	432.5	117.1	320.1	354.7	181.7	370.0	86.5	5153.1
419.1	1478.8	499.6	503.0	136.2	372.2	412.5	211.3	429.2	100.6	5987.4

Alaskan Beaufort Support Vessel Emissions Data

Assumptions

- 1 Emissions Sources per vessel specs
- 2 Load for each emissions source in each environmental condition estimated
- 3 Environmental conditions based on historical evidence for the past 3 years over anticipated season length:

Description	Tenths Ice	% Time			Days Per 60 Day Season
Open Water	0-2	62	20	12.4	37.2
Moderate Ice	2-8	23	30	6.9	13.8
Heavy Ice	8-10	15	50	7.5	9
- 4 Average seasonal daily usage is the calculated weighted average of the load per environmental condition times the percent occurrence
- 5 For the tow vessels, towing requirements are equivalent to heavy ice condition
- 6 For the Kilabuk, which will be used for resupply, the categories are In Transit and Standing By, the condition during which the vessel is r
- 7 Engine usage and load estimates from Suman Muddusetti, numbers in blue changed by KMC for consistency with Finstaship email wrt t

Description	Brake HPP	Units	Open Water			Moderate Ice		
			Used (y/n)	Load	Load*HP	Used (y/n)	Load	Load*HP
VLADIMIR IGNATJUK								
Main Engine	5800	BHP	Y	65%	3770	Y	70%	4060
Main Engine	5800	BHP	Y	65%	3770	Y	70%	4060
Main Engine	5800	BHP			0			0
Main Engine	5800	BHP			0			0
Generator	980	Kw	Y	60%	588	Y	50%	490
Generator	980	Kw			0	N		0
Emergency Generator	200	Kw			0			0
Heat Boiler	2.4	MMBTUh	Y	40%	0.96	Y	50%	1.2
Hot Water Heat	0.54	MMBTUh	Y	100%	0.54	Y	100%	0.54
Incinerator	65	lb/hr			0			0
NORDICA (2008-9)								
Main Engine/Generator	6000	KW	Y	20%	4500			0
Main Engine/Generator	6000	KW			0	Y	70%	4200
Main Engine/Generator	4500	KW	Y	20%	3375	Y	70%	3150
Main Engine/Generator	4500	KW			0	Y	70%	3150
Harbor Generator	710	KW			0			0

	Emergency Generator	300	KW			0			0
	Heat Boiler	1300	KW	Y	50%	650	Y	50%	650
	Heat Boiler	1300	KW			0	Y	50%	650
	Incinerator	Unknown	Unknown						
KAPITAN DRANITSYN									
	Main Engine	4140	BHP	Y	40%	1656	Y	70%	2898
	Main Engine	4140	BHP	Y	40%	1656	Y	70%	2898
	Main Engine	4140	BHP	Y	40%	1656	Y	70%	2898
	Main Engine	4140	BHP			0			0
	Main Engine	4140	BHP			0			0
	Main Engine	4140	BHP			0			0
	Auxiliary Engine	1050	BHP	Y	40%	420	Y	70%	735
	Auxiliary Engine	1050	BHP	Y	40%	420	Y	70%	735
	Auxiliary Engine	1050	BHP	Y	40%	420	Y	70%	735
	Auxiliary Engine	1050	BHP			0			0
	Auxiliary Engine	1050	BHP			0			0
	Diesel Compressor	1050	Kw			0			0
	Diesel Compressor	1050	Kw			0			0
	Emergency Generator	300	Kw			0			0
	Heat Boiler		MMBTUh	Y	100%	#VALUE!	Y	100%	#VALUE!
	Heat Boiler		MMBTUh			0			0
	Incinerator	NA	lb/hr			0			0
TOR VIKING/VIDAR VIKING (Used only in 2007 with the Discoverer)									
	Main Engine/Generator	3840	kW	Y	20%	2880			0
	Main Engine/Generator	3840	kW			0	Y	70%	2688
	Main Engine/Generator	2880	kW	Y	20%	2160	Y	70%	2016
	Main Engine/Generator	2880	kW			0	Y	70%	2016
	Harbour generator	800	kW			0	Y	50%	400
	Emergency Generator	174	kW			0			0
	Heat Boiler	400	kW	Y	50%	200	Y	50%	200
	Incinerator	Unknown	Unknown						

In Transit

Standing By

JIM KILABUK (Used primarily for resupply of Discoverer and Kulluk

Main Engine, Diesel V20 645 EMD	3600	BHP	Y	35%	1260	Y	10%	2016
Main Engine, Diesel V20 645 EMD	3600	BHP	Y	35%	1260	Y	10%	2016
Generator, Diesel Cat D3406	200	KW	Y	35%	70	Y	35%	2016
Generator, Diesel Cat D3406	200	KW						
HPP, Diesel Cat D343	300	BHP						
Bow Thruster Diesel Cat D343	300	BHP	Y	10%	30	Y	10%	2016

Comb. 1 Comb 2 Comb 3 Comb 4

60
 55.8 19.6
 44.4

moored to the rig during off loading of supplies
 the Nordica

Heavy Ice			Season Average		
<u>Used (y/n)</u>	<u>Load</u>	<u>Load*HP</u>	<u>Used (y/n)</u>	<u>Load</u>	<u>Load*HP</u>
Y	70%	4060	Y	66.9%	3880
Y	70%	4060	Y	66.9%	3880
Y	70%	4060	Y	10.5%	609
Y	70%	4060	Y	10.5%	609
Y	60%	588	Y	57.7%	565
N		0	N	0.0%	0
		0			0
Y	60%	1.44	Y	45.3%	1.09
Y	100%	0.54	Y	100.0%	0.54
		0			0
Y	80%	4800	Y	24.40%	1464
Y	80%	4800	Y	28.10%	1686
Y	80%	3600	Y	40.50%	1823
Y	80%	3600	Y	28.10%	1265
		0		0.00%	0

		0		0.00%	0
Y	50%	650	Y	50.00%	650
Y	80%	1040	Y	23.50%	306
Y	70%	2898	Y	51.40%	2128
Y	70%	2898	Y	51.40%	2128
Y	70%	2898	Y	51.40%	2128
Y	70%	2898	Y	10.50%	435
Y	70%	2898	Y	10.50%	435
Y	70%	2898	Y	10.50%	435
Y	70%	735	Y	51.40%	540
Y	70%	735	Y	51.40%	540
Y	70%	735	Y	51.40%	540
Y	70%	735	Y	10.50%	110
		0		0.00%	0
		0		0.00%	0
		0		0.00%	0
		0		0.00%	0
Y	100%	#VALUE!	Y	100.00%	#VALUE!
		0		0.00%	0
		0		0.00%	0
Y	90%	3456	Y	25.90%	995
Y	90%	3456	Y	29.60%	1137
Y	90%	2592	Y	42.00%	1210
Y	90%	2592	Y	29.60%	852
Y	50%	400	Y	19.00%	152
		0			
Y	50%	200	Y	50.00%	200

2007 Beaufort Emissions Timeline

Assumptions:

- 1 Kulluk Prime Movers, per Roger and Boyd
While moving or MLC work, 1 engine@100 percent, 1 engine at 20 percent, 1 engine at 0 percent
While drilling, 1 engine at 100 percent, 1 engine at 40 percent, 1 engine at 0 percent
- 2 Air Compressors, per Roger and Boyd
While MLC work, (bit drilling time only), 2 compressors at 100 percent, 1 compressor at 0 percent
While drilling the 36" hole, 1 compressor at 100 percent, 2 compressors at 0 percent
- 3 HPP units: per Roger and Boyd
While MLC work, (bit drilling time only), 2 units at 100 percent, 2 units at 0 percent
All other times, all units at 0 percent
- 4 HPP Units and Compressors time per well is based on actual performance in the Chukchi Sea
- 5 Cranes. Based on estimates of previous performance, use no 1 crane 8 hours per day, no 2 and 3

cranes 3 hours/day (averages)

2007 Discoverer Beaufort Sea Mud Line Cellar Air Emissions Time Line

Comments

- 1 OCS blocks are most likely, Ice conditions could force drilling on other OCS blocks
- 2 Anchor winches are powered by prime movers
- 3 Moving to next location, emissions are included for the time the rig is inside the 25 mile radius of impact, the Discoverer transit during these times a Mob, DeMob, Moving to next location, is considered only when the vessel enters the 25 mile radius of impact for each well location.
- 4 During whaling season, the rig will be required to be in essentially an idle condition, ie. No active operations, but maybe slow mud circulation, hours
- 5 Equipment noted as Electric in the Units column, are powered by the rig or other emissions devices and are therefore not emissions sources
- 6 Ice Management vessel emissions based on average engine loads for average season conditions based on season conditions over the last 3 years
- 7 Per Frontier, the Discoverer's propulsion engine will run while underway, and during anchor running and recovery operations
- 8 The Jim Kilabuk will resupply each Kulluk an estimated once every other week. The vessel In Transit emissions are included only during the time it The vessel will be tied up to the rig and unload (Standby) in 24 hours, then demob out of the area.
- 9 The Kilabuk will transit at 12 knots, the mob/demob time is therefore roughly 2 hours
- 10 Changes to the KD are the result of late information from Murmansk Shipping

Time Line

Loc 1/4				
Activity	Mob Discoverer to in 25 mile radius	Run Anchors	Drill MLC 1	Drill 36" Hole, Install 30"
OCS Block	NA	OCS-Y 6801	OCS-Y 6801	OCS-Y 6801
Distance to Shoreline (miles)	NA	15.8	15.8	15.8
Days	0.1	1.0	7.1	1.4
Cumulative Days	0.1	1.1	8.2	9.6
Date	8/1/2007	8/2/2007	8/9/2007	8/10/2007

Emissions Source (Values are in 24-hour Days)

DISCOVERER RIG	Rating	Units				
Drlg Engine>Cat 399 diesel	976	KW	0.1	0.7	5.0	0.9
Drlg Engine>Cat 399 diesel	976	KW	0.1	0.7	5.0	0.9
Drlg Engine>Cat 399 diesel	976	KW		0.7	5.0	0.9
Drlg Engine>Cat 399 diesel	976	KW		0.7	5.0	0.9
Drlg Engine>Cat 399 diesel	976	KW		0.7	5.0	0.9
Drlg Engine>Cat 399 diesel	976	KW		0.7	5.0	0.9
Prop. Engine> Mit 6UEC65 diesel	5375	KW	0.1	0.8		

Emergency Generator >Cat 3304 diesel	90	KW				
Air Compressor	500	BHP			1.0	1.4
Air Compressor	500	BHP			1.0	
Air Compressor	500	BHP				
HPP Engine<600 hp diesel	250	BHP			1.0	
HPP Engine<600 hp diesel	250	BHP			1.0	
Port Fwd Deck Crane> Cat D343 Diesel	365	BHP		0.2	1.1	0.2
Stbd Fwd Deck Crane> Cat D343 Diesel	365	BHP		0.2	1.1	0.2
Cementing Unit Engine 1 Diesel	325	BHP				0.3
Cementing Unit Engine 2 Diesel	325	BHP				0.3
Logging Winch Detroit 471 Diesel	140	BHP				
Well Log Back Genset, Detroit 471 Diesel	120	BHP				
Heat Boiler	200	BHP	0.1	0.4	2.8	0.5
Heat Boiler	200	BHP	0.1	0.4	2.8	0.5
KAPITAN DRANITSYN						
Main Engine	4140	BHP	0.1	0.5	3.6	0.7
Main Engine	4140	BHP	0.1	0.5	3.6	0.7
Main Engine	4140	BHP	0.1	0.5	3.6	0.7
Main Engine	4140	BHP	0.0	0.1	0.7	0.1
Main Engine	4140	BHP	0.0	0.1	0.7	0.1
Main Engine	4140	BHP	0.0	0.1	0.7	0.1
Auxiliary Engine	1050	BHP	0.1	0.5	3.6	0.7
Auxiliary Engine	1050	BHP	0.1	0.5	3.6	0.7
Auxiliary Engine	1050	BHP	0.1	0.5	3.6	0.7
Auxiliary Engine	1050	BHP	0.0	0.1	0.7	0.1
Auxiliary Engine	1050	BHP	0.0	0.0	0.0	0.0
Diesel Compressor	1050	Kw	0.0	0.0	0.0	0.0
Diesel Compressor	1050	Kw	0.0	0.0	0.0	0.0
Emergency Generator	300	Kw	0.0	0.0	0.0	0.0
Heat Boiler	18	MMBTUh	0.1	1.0	7.1	1.4
Heat Boiler	18	MMBTUh	0.0	0.0	0.0	0.0
Incinerator	NA	lb/hr	0.0	0.0	0.0	0.0
NORDICA (2007-2009)						
Main Engine	6000	KW	0.0	0.2	1.7	0.3
Main Engine	6000	KW	0.0	0.3	2.0	0.4

Main Engine	4500	KW	0.1	0.4	2.9	0.5
Main Engine	4500	KW	0.0	0.3	2.0	0.4
Auxilliary Engine	710	HP	0.0	0.0	0.0	0.0
Emergency Generator	300	HP	0.0	0.0	0.0	0.0
Heat Boiler	1300	KW	0.1	0.5	3.5	0.7
Heat Boiler	1300	KW	0.0	0.2	1.7	0.3
Incinerator	Unknown	Unknown	0.0	0.0	0.0	0.0
JIM KILABUK (Used primarily for resupply of Discoverer and Kulluk)						
Main Engine, Diesel V20 645 EMD	3600	BHP	0.0	0.1	0.0	
Main Engine, Diesel V20 645 EMD	3600	BHP	0.0	0.1	0.0	
Generator, Diesel Cat D3406	200	KW	0.0	0.4	0.0	
Generator, Diesel Cat D3406	200	KW				
HPP, Diesel Cat D343	300	BHP				
Bow Thruster Diesel Cat D343	300	BHP	0.0	0.1	0.0	

Associated Fuel Usage (m3)

DISCOVER			4.0	20.7	146.6	28.0
KAPITAN DRANITSYN			7.6	58.7	415.8	79.5
NORDICA			5.0	38.4	272.0	52.0
JIM KILABUK			1.1	4.5	1.1	
Total			17.7	122.3	835.5	159.5

	Vessel	Fuel Consumption	
		Average m3/Day	Towing/Transit m3/Day
at 8 knots	Kulluk	20	12
	Discoverer	20.7	30.4
sekeeping systems	Vladimer Ignatjuk	42.2	NA
	Kapitan Dranitsyn	58.7	NA
	Nordica	38.4	98.7
	Fennica	38.4	98.7
	Viking	24.3	78.2
is in the 25 mile radius of impact.	Jim Kilabuk	4.5	12.5

						Loc total
Drill Pilot Hole, OH, Install 20" at 1000 ft OCS-Y 6801	Drill 17 1/2" Hole, Install 13 3/8" at 2650 ft OCS-Y 6801	Drill to TD, at 8000 ft OCS-Y 6801	Evaluate, P&A OCS-Y 6801	Shut Down for Whaling Season OCS-Y 6801	Retrieve Anchors OCS-Y 6824	
15.8	15.8	15.8	15.8	15.8	15.8	
3.7	4.1	2.1	4.2	14.0	1.0	38.7
13.3	17.4	19.5	23.7	37.7	38.7	
8/14/2007	8/18/2007	8/20/2007	8/24/2007	9/7/2007	9/8/2007	
						38.67
2.6	2.9	1.5	2.9	11.2	0.7	28.5
2.6	2.9	1.5	2.9		0.7	17.3
2.6	2.9	1.5	2.9		0.7	17.2
2.6	2.9	1.5	2.9		0.7	17.2
2.6	2.9	1.5	2.9		0.7	17.2
2.6	2.9	1.5	2.9		0.7	17.2
					0.8	1.7

						0.0
						2.4
						1.0
						0.0
						1.0
						1.0
0.6	0.6	0.3	0.6		0.2	3.7
0.6	0.6	0.3	0.6		0.2	3.7
0.3	0.3		0.3			1.0
0.3	0.3		0.3			1.0
0.3	0.3		1.5			2.0
						0.0
1.5	1.6	0.8	1.7	5.6	0.4	15.5
1.5	1.6	0.8	1.7		0.4	9.9
1.9	2.1	1.1	2.2	7.2	0.5	19.9
1.9	2.1	1.1	2.2	7.2	0.5	19.9
1.9	2.1	1.1	2.2	7.2	0.5	19.9
0.4	0.4	0.2	0.4	1.5	0.1	4.1
0.4	0.4	0.2	0.4	1.5	0.1	4.1
0.4	0.4	0.2	0.4	1.5	0.1	4.1
1.9	2.1	1.1	2.2	7.2	0.5	19.9
1.9	2.1	1.1	2.2	7.2	0.5	19.9
1.9	2.1	1.1	2.2	7.2	0.5	19.9
0.4	0.4	0.2	0.4	1.5	0.1	4.1
0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.7	4.1	2.1	4.2	14.0	1.0	38.7
0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.9	1.0	0.5	1.0	3.4	0.2	9.4
1.0	1.2	0.6	1.2	3.9	0.3	10.9

1.5	1.7	0.9	1.7	5.7	0.4	15.7
1.0	1.2	0.6	1.2	3.9	0.3	10.9
0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.9	2.1	1.1	2.1	7.0	0.5	19.3
0.9	1.0	0.5	1.0	3.3	0.2	9.1
0.0	0.0	0.0	0.0	0.0	0.0	0.0

	0.2			0.2		0.5
	0.2			0.2		0.5
	0.4			0.4		1.2
						0.0
						0.0
	0.2			0.2		0.5

76.6	84.9	43.5	86.9	289.8	20.7	801.7
217.2	240.7	123.3	246.5	821.8	58.7	2269.8
142.1	157.4	80.6	161.3	537.6	38.4	1484.8
	6.7			6.7		13.3
435.9	489.7	247.4	494.8	1655.9	117.8	4576.3

Loc 2/4

Move to next Location	Run Anchors	Drill MLC 2	Install 30"	Drill Pilot Hole, OH, Install 20" at 1000 ft	Drill 17 1/2" Hole, Install 13 3/8" at 2650 ft	Drill to 12 1/4", install 9 5/8" at 8000 ft	Drill 8 1/2" Hole to TD at 11400 ft
OCS-Y 6824	OCS-Y 6824	OCS-Y 6824	OCS-Y 6824	OCS-Y 6824	OCS-Y 6824	OCS-Y 6824	OCS-Y 6824
NA	13	13	13	13	13	13	
0.3	1.0	7.1	1.4	3.7	4.1	14.7	4.9
38.9	39.9	47.0	48.4	52.1	56.2	70.9	75.8
9/8/2007	9/9/2007	9/16/2007	9/18/2007	9/21/2007	9/26/2007	10/10/2007	10/15/2007
0.2	0.7	5.0	0.9	2.6	2.9	10.3	3.4
0.2	0.7	5.0	0.9	2.6	2.9	10.3	3.4
	0.7	5.0	0.9	2.6	2.9	10.3	3.4
	0.7	5.0	0.9	2.6	2.9	10.3	3.4
	0.7	5.0	0.9	2.6	2.9	10.3	3.4
0.2	0.8						

		1.0	1.4					
		1.0						
		1.0						
		1.0						
	0.2	1.1	0.2	0.6	0.6	2.2	0.7	
	0.2	1.1	0.2	0.6	0.6	2.2	0.7	
			0.3	0.3	0.3	0.3		
			0.3	0.3	0.3	0.3		
				0.3	0.3	1.5		
0.1	0.4	2.8	0.5	1.5	1.6	5.9	2.0	
0.1	0.4	2.8	0.5	1.5	1.6	5.9	2.0	
0.1	0.5	3.6	0.7	1.9	2.1	7.6	2.5	
0.1	0.5	3.6	0.7	1.9	2.1	7.6	2.5	
0.1	0.5	3.6	0.7	1.9	2.1	7.6	2.5	
0.0	0.1	0.7	0.1	0.4	0.4	1.5	0.5	
0.0	0.1	0.7	0.1	0.4	0.4	1.5	0.5	
0.0	0.1	0.7	0.1	0.4	0.4	1.5	0.5	
0.1	0.5	3.6	0.7	1.9	2.1	7.6	2.5	
0.1	0.5	3.6	0.7	1.9	2.1	7.6	2.5	
0.1	0.5	3.6	0.7	1.9	2.1	7.6	2.5	
0.0	0.1	0.7	0.1	0.4	0.4	1.5	0.5	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
0.3	1.0	7.1	1.4	3.7	4.1	14.7	4.9	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
0.1	0.2	1.7	0.3	0.9	1.0	3.6	1.2	
0.1	0.3	2.0	0.4	1.0	1.2	4.1	1.4	

0.1	0.4	2.9	0.5	1.5	1.7	6.0	2.0
0.1	0.3	2.0	0.4	1.0	1.2	4.1	1.4
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.1	0.5	3.5	0.7	1.9	2.1	7.4	2.5
0.1	0.2	1.7	0.3	0.9	1.0	3.5	1.2
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

0.2	0.2	0.2
0.2	0.2	0.2
0.4	0.4	0.4

0.2	0.2	0.2
-----	-----	-----

7.9	20.7	146.6	28.0	76.6	84.9	304.3	101.4
15.3	58.7	415.8	79.5	217.2	240.7	862.9	287.6
10.0	38.4	272.0	52.0	142.1	157.4	564.5	188.2
		6.7			6.7		6.7
33.2	117.8	841.1	159.5	435.9	489.7	1731.7	583.9

		Loc total	Loc 3/4					
Evaluate, P&A OCS-Y 6824	Retrieve Anchors OCS-Y 6824		Move to next Location OCS-Y TBD	Run Anchors OCS-Y TBD	Drill MLC 3 OCS-Y TBD	Install 30" OCS-Y TBD	Drill Pilot Hole, OH, Install 20" at 1000 ft OCS-Y TBD	
	13		13	13	13	13	15.8	
5.0	1.0	43.1	0.3	1.0	7.1	1.4	3.7	
80.8	81.8		82.0	83.0	90.1	91.5	95.2	
10/20/2007	10/21/2007		10/21/2007	10/22/2007	10/29/2007	10/31/2007	11/4/2007	
		43.10						
3.5	0.7	30.2	0.2	0.7	5.0	0.9	2.6	
3.5	0.7	30.2	0.2	0.7	5.0	0.9	2.6	
3.5	0.7	30.0		0.7	5.0	0.9	2.6	
3.5	0.7	30.0		0.7	5.0	0.9	2.6	
3.5	0.7	30.0		0.7	5.0	0.9	2.6	
3.5	0.7	30.0		0.7	5.0	0.9	2.6	
	0.8	1.8	0.2	0.8				

		0.0						
		2.4			1.0	1.4		
		1.0			1.0			
		0.0						
		1.0			1.0			
		1.0			1.0			
0.8	0.2	6.4		0.2	1.1	0.2	0.6	
0.8	0.2	6.4		0.2	1.1	0.2	0.6	
0.3		1.3				0.3	0.3	
0.3		1.3				0.3	0.3	
1.5		3.5					0.3	
		0.0						
2.0	0.4	17.2	0.1	0.4	2.8	0.5	1.5	
2.0	0.4	17.2	0.1	0.4	2.8	0.5	1.5	
2.6	0.5	22.2	0.1	0.5	3.6	0.7	1.9	
2.6	0.5	22.2	0.1	0.5	3.6	0.7	1.9	
2.6	0.5	22.2	0.1	0.5	3.6	0.7	1.9	
0.5	0.1	4.5	0.0	0.1	0.7	0.1	0.4	
0.5	0.1	4.5	0.0	0.1	0.7	0.1	0.4	
0.5	0.1	4.5	0.0	0.1	0.7	0.1	0.4	
2.6	0.5	22.2	0.1	0.5	3.6	0.7	1.9	
2.6	0.5	22.2	0.1	0.5	3.6	0.7	1.9	
2.6	0.5	22.2	0.1	0.5	3.6	0.7	1.9	
0.5	0.1	4.5	0.0	0.1	0.7	0.1	0.4	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5.0	1.0	43.1	0.3	1.0	7.1	1.4	3.7	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1.2	0.2	10.5	0.1	0.2	1.7	0.3	0.9	
1.4	0.3	12.1	0.1	0.3	2.0	0.4	1.0	

2.0	0.4	17.5	0.1	0.4	2.9	0.5	1.5
1.4	0.3	12.1	0.1	0.3	2.0	0.4	1.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.5	0.5	21.5	0.1	0.5	3.5	0.7	1.9
1.2	0.2	10.1	0.1	0.2	1.7	0.3	0.9
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

0.5	0.2
0.5	0.2
1.2	0.4
0.0	
0.0	
0.5	0.2

103.5	20.7	894.7	7.9	20.7	146.6	28.0	76.6
293.5	58.7	2529.8	15.3	58.7	415.8	79.5	217.2
192.0	38.4	1655.0	10.0	38.4	272.0	52.0	142.1
		13.3			6.7		
589.0	117.8	5099.5	33.2	117.8	841.1	159.5	435.9

<i>Loc total</i>				Loc 4/4			
Drill 17 1/2" Hole, Install 13 3/8" at 2650 ft OCS-Y TBD 15.8 4.1 99.3 11/8/2007	Drill to TD, at 8000 ft OCS-Y TBD 15.8 2.1 101.4 11/10/2007	Evaluate, P&A OCS-Y TBD 15.8 4.2 105.6 11/14/2007	Retrieve Anchors OCS-Y TBD 13 1.0 106.6 11/15/2007		Move to next Location OCS-Y TBD 13 0.3 106.8 11/15/2007	Run Anchors OCS-Y TBD 13 1.0 107.8 11/16/2007	Drill MLC 4 OCS-Y TBD 13 7.1 114.9 11/23/2007
				24.8			
				24.8			
2.9	1.5	2.9	0.7	17.4	0.2	0.7	5.0
2.9	1.5	2.9	0.7	17.4	0.2	0.7	5.0
2.9	1.5	2.9	0.7	17.2		0.7	5.0
2.9	1.5	2.9	0.7	17.2		0.7	5.0
2.9	1.5	2.9	0.7	17.2		0.7	5.0
2.9	1.5	2.9	0.7	17.2		0.7	5.0
			0.8	1.8	0.2	0.8	

				0.0			
				2.4			1.0
				1.0			1.0
				0.0			
				1.0			1.0
				1.0			1.0
0.6	0.3	0.6	0.2	3.7		0.2	1.1
0.6	0.3	0.6	0.2	3.7		0.2	1.1
0.3		0.3		1.0			
0.3		0.3		1.0			
0.3		1.5		2.0			
				0.0			
1.6	0.8	1.7	0.4	9.9	0.1	0.4	2.8
1.6	0.8	1.7	0.4	9.9	0.1	0.4	2.8
2.1	1.1	2.2	0.5	12.7	0.1	0.5	3.6
2.1	1.1	2.2	0.5	12.7	0.1	0.5	3.6
2.1	1.1	2.2	0.5	12.7	0.1	0.5	3.6
0.4	0.2	0.4	0.1	2.6	0.0	0.1	0.7
0.4	0.2	0.4	0.1	2.6	0.0	0.1	0.7
0.4	0.2	0.4	0.1	2.6	0.0	0.1	0.7
2.1	1.1	2.2	0.5	12.7	0.1	0.5	3.6
2.1	1.1	2.2	0.5	12.7	0.1	0.5	3.6
2.1	1.1	2.2	0.5	12.7	0.1	0.5	3.6
0.4	0.2	0.4	0.1	2.6	0.0	0.1	0.7
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.1	2.1	4.2	1.0	24.8	0.3	1.0	7.1
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0	0.5	1.0	0.2	6.1	0.1	0.2	1.7
1.2	0.6	1.2	0.3	7.0	0.1	0.3	2.0

1.7	0.9	1.7	0.4	10.0	0.1	0.4	2.9
1.2	0.6	1.2	0.3	7.0	0.1	0.3	2.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.1	1.1	2.1	0.5	12.4	0.1	0.5	3.5
1.0	0.5	1.0	0.2	5.8	0.1	0.2	1.7
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

0.2	0.3
0.2	0.3
0.4	0.8
	0.0
	0.0
0.2	0.3

84.9	43.5	86.9	20.7	515.8	7.9	20.7	146.6
240.7	123.3	246.5	58.7	1455.6	15.3	58.7	415.8
157.4	80.6	161.3	38.4	952.2	10.0	38.4	272.0
		6.7		6.7			
483.0	247.4	501.4	117.8	2937.1	33.2	117.8	834.4

			<i>Loc total</i>	<i>Season Total</i>
		Demob Discoverer out of 25 mile radius		
Install 30" OCS-Y TBD	Retrieve Anchors OCS-Y TBD			
13	13			
1.4	1.0	0.1	10.8	117.4
116.3	117.3	117.4		
11/25/2007	11/26/2007	11/26/2007		
			10.8	117.4
0.9	0.7	0.1	7.6	83.6
0.9	0.7	0.1	7.6	72.4
0.9	0.7		7.3	71.6
0.9	0.7		7.3	71.6
0.9	0.7		7.3	71.6
0.9	0.7		7.3	71.6
	0.8	0.1	1.9	7.2

			0.0	0.0
1.4			2.4	9.4
			1.0	4.0
			0.0	0.0
			1.0	4.0
			1.0	4.0
0.2	0.2		1.6	15.4
0.2	0.2		1.6	15.4
0.3			0.3	3.5
0.3			0.3	3.5
			0.0	7.5
			0.0	0.0
0.5	0.4	0.1	4.3	47.0
0.5	0.4	0.1	4.3	41.4
0.7	0.5	0.1	5.6	60.3
0.7	0.5	0.1	5.6	60.3
0.7	0.5	0.1	5.6	60.3
0.1	0.1	0.0	1.1	12.3
0.1	0.1	0.0	1.1	12.3
0.1	0.1	0.0	1.1	12.3
0.7	0.5	0.1	5.6	60.3
0.7	0.5	0.1	5.6	60.3
0.7	0.5	0.1	5.6	60.3
0.1	0.1	0.0	1.1	12.3
0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0
1.4	1.0	0.1	10.8	117.4
0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0
0.3	0.2	0.0	2.6	28.6
0.4	0.3	0.0	3.0	33.0

51%

0.5	0.4	0.1	4.4	47.5
0.4	0.3	0.0	3.0	33.0
0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0
0.7	0.5	0.1	5.4	58.7
0.3	0.2	0.0	2.5	27.6
0.0	0.0	0.0	0.0	0.0

0.0	1.3
0.0	1.3
0.0	3.3
0.0	0.0
0.0	0.0
0.0	1.3

264.17

gallons per cubic meter
Total (gallons)

28.0	20.7	4.0	227.9	2440.1	644,604
79.5	58.7	7.6	635.6	6890.9	1,820,367
52.0	38.4	5.0	415.8	4507.8	1,190,836
			0.0	53.4	14,096
159.5	117.8	16.6	1279.3	13892.2	3,669,903

Alaskan Beaufort Support Vessel Emissions Data

Assumptions

- 1 Emissions Sources per vessel specs
- 2 Load for each emissions source in each environmental condition estimated
- 3 Environmental conditions based on historical evidence for the past 3 years over anticipated season length:

Description	Tenths Ice	% Time			Days Per 60 Day Season
Open Water	0-2	62	20	12.4	37.2
Moderate Ice	2-8	23	30	6.9	13.8
Heavy Ice	8-10	15	50	7.5	9
- 4 Average seasonal daily usage is the calculated weighted average of the load per environmental condition times the percent occurrence
- 5 For the tow vessels, towing requirements are equivalent to heavy ice condition
- 6 For the Kilabuk, which will be used for resupply, the categories are In Transit and Standing By, the condition during which the vessel is r
- 7 Engine usage and load estimates from Suman Muddusetti, numbers in blue changed by KMC for consistency with Finstaship email wrt t

Description	Brake HPP	Units	Open Water			Moderate Ice		
			Used (y/n)	Load	Load*HP	Used (y/n)	Load	Load*HP
VLADIMIR IGNATJUK								
Main Engine	5800	BHP	Y	65%	3770	Y	70%	4060
Main Engine	5800	BHP	Y	65%	3770	Y	70%	4060
Main Engine	5800	BHP			0			0
Main Engine	5800	BHP			0			0
Generator	980	Kw	Y	60%	588	Y	50%	490
Generator	980	Kw			0	Y		0
Emergency Generator	200	Kw			0			0
Heat Boiler	2.4	MMBTUh	Y	40%	0.96	Y	50%	1.2
Hot Water Heat	0.54	MMBTUh	Y	100%	0.54	Y	100%	0.54
Incinerator	65	lb/hr			0			0
NORDICA (2008-9)								
Main Engine/Generator	6000	KW	Y	20%	4500			0
Main Engine/Generator	6000	KW			0	Y	70%	4200
Main Engine/Generator	4500	KW	Y	20%	3375	Y	70%	3150
Main Engine/Generator	4500	KW			0	Y	70%	3150
Harbor Generator	710	KW			0			0

	Emergency Generator	300	KW			0			0
	Heat Boiler	1300	KW	Y	50%	650	Y	50%	650
	Heat Boiler	1300	KW			0	Y	50%	650
	Incinerator	Unknown	Unknown						
KAPITAN DRANITSYN									
	Main Engine	4140	BHP	Y	40%	1656	Y	70%	2898
	Main Engine	4140	BHP	Y	40%	1656	Y	70%	2898
	Main Engine	4140	BHP	Y	40%	1656	Y	70%	2898
	Main Engine	4140	BHP			0			0
	Main Engine	4140	BHP			0			0
	Main Engine	4140	BHP			0			0
	Auxiliary Engine	1050	BHP	Y	40%	420	Y	70%	735
	Auxiliary Engine	1050	BHP	Y	40%	420	Y	70%	735
	Auxiliary Engine	1050	BHP	Y	40%	420	Y	70%	735
	Auxiliary Engine	1050	BHP			0			0
	Auxiliary Engine	1050	BHP			0			0
	Diesel Compressor	1050	Kw			0			0
	Diesel Compressor	1050	Kw			0			0
	Emergency Generator	300	Kw			0			0
	Heat Boiler		MMBTUh	Y	100%	#VALUE!	Y	100%	#VALUE!
	Heat Boiler		MMBTUh			0			0
	Incinerator	NA	lb/hr			0			0
TOR VIKING/VIDAR VIKING (Used only in 2007 with the Discoverer)									
	Main Engine/Generator	3840	kW	Y	20%	2880			0
	Main Engine/Generator	3840	kW			0	Y	70%	2688
	Main Engine/Generator	2880	kW	Y	20%	2160	Y	70%	2016
	Main Engine/Generator	2880	kW			0	Y	70%	2016
	Harbour generator	800	kW			0	Y	50%	400
	Emergency Generator	174	kW			0			0
	Heat Boiler	400	kW	Y	50%	200	Y	50%	200
	Incinerator	Unknown	Unknown						

In Transit

Standing By

JIM KILABUK (Used primarily for resupply of Discoverer and Kulluk

Main Engine, Diesel V20 645 EMD	3600	BHP	Y	35%	1260	Y	10%	2016
Main Engine, Diesel V20 645 EMD	3600	BHP	Y	35%	1260	Y	10%	2016
Generator, Diesel Cat D3406	200	KW	Y	35%	70	Y	35%	2016
Generator, Diesel Cat D3406	200	KW						
HPP, Diesel Cat D343	300	BHP						
Bow Thruster Diesel Cat D343	300	BHP	Y	10%	30	Y	10%	2016

Comb. 1 Comb 2 Comb 3 Comb 4

60
 55.8 19.6
 44.4

moored to the rig during off loading of supplies
 the Nordica

Heavy Ice			Season Average		
<u>Used (y/n)</u>	<u>Load</u>	<u>Load*HP</u>	<u>Used (y/n)</u>	<u>Load</u>	<u>Load*HP</u>
Y	70%	4060	Y	66.9%	3880
Y	70%	4060	Y	66.9%	3880
Y	70%	4060	Y	10.5%	609
Y	70%	4060	Y	10.5%	609
Y	60%	588	Y	57.7%	565
N		0	N	0.0%	0
		0			0
Y	60%	1.44	Y	45.3%	1.09
Y	100%	0.54	Y	100.0%	0.54
		0			0
Y	80%	4800	Y	24.40%	1464
Y	80%	4800	Y	28.10%	1686
Y	80%	3600	Y	40.50%	1823
Y	80%	3600	Y	28.10%	1265
		0		0.00%	0

		0		0.00%	0
Y	50%	650	Y	50.00%	650
Y	80%	1040	Y	23.50%	306
Y	70%	2898	Y	51.40%	2128
Y	70%	2898	Y	51.40%	2128
Y	70%	2898	Y	51.40%	2128
Y	70%	2898	Y	10.50%	435
Y	70%	2898	Y	10.50%	435
Y	70%	2898	Y	10.50%	435
Y	70%	735	Y	51.40%	540
Y	70%	735	Y	51.40%	540
Y	70%	735	Y	51.40%	540
Y	70%	735	Y	10.50%	110
		0		0.00%	0
		0		0.00%	0
		0		0.00%	0
		0		0.00%	0
Y	100%	#VALUE!	Y	100.00%	#VALUE!
		0		0.00%	0
		0		0.00%	0
Y	90%	3456	Y	25.90%	995
Y	90%	3456	Y	29.60%	1137
Y	90%	2592	Y	42.00%	1210
Y	90%	2592	Y	29.60%	852
Y	50%	400	Y	19.00%	152
		0			
Y	50%	200	Y	50.00%	200

2007 Beaufort Emissions Timeline

Assumptions:

- 1 Discover emissions sources and loads per Frontier
- 2 Air Compressors, per Roger and Boyd
 - While MLC work, (bit drilling time only), 2 compressors at 100 percent, 1 compressor at 0 percent
 - While drilling the 36" hole, 1 compressor at 100 percent, 2 compressors at 0 percent
- 3 HPP units: per Roger and Boyd
 - While MLC work, (bit drilling time only), 2 units at 100 percent, 2 units at 0 percent
 - All other times, all units at 0 percent
- 4 Support vessels, weighted average for loads for open water, moderate ice, heavy ice, based on 3 y
- 5 Fleet arrives on location at the same time, emissions logged only while in the 25 mile radius of imp
- 6 Discovery transit rate within the 25 mile radius of impact is 8 knots

year historical average in Beaufort
act