



Shell E&P Ireland Ltd

Corrib Marine Mammal Observations

Initial Umbilical & Pipeline Survey 2017

P660841

JULY 2017

RSK



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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

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1 INTRODUCTION

RSK Environment Ltd has been engaged by Shell Exploration and Production Ireland Ltd (SEPIL) to provide various environmental services during the development of the Corrib field including the offshore gas pipeline and associated facilities.

Marine Mammal Observers (MMOs) are required to be present on vessels at the commencement of noise-generating activities (e.g. geophysical survey and dredging operations) under the code of practice agreed between SEPIL and National Parks and Wildlife Service (NPWS). Records are made of any marine mammals seen before or during construction operations (which are delayed if marine mammals are sighted within 500 m of the noise-generating vessel before it starts work), and reported monthly.

This is the first MMO report for 2017, and covers the initial survey scopes during late June and early July, comprising umbilical and pipeline inspections undertaken aboard the inshore survey vessel *Au Gearoidin* and the offshore survey vessel *Subsea Viking*. The whole series of 2017 MMO reports will, where possible, draw comparisons with observations made in previous months, and also with the same month in previous years, in terms of abundance and diversity of marine mammals.

The series of reports will be submitted to the Department of Communications, Climate Action and Environment (DCCA) and copied to NPWS.

2 RECORDS

2.1 Summary

From 23rd June until 3rd July 2017, daily watches were conducted for marine mammals by one MMO aboard nearshore survey vessel, *Au Gearoidin*, which conducted multi-beam and side-scan SONAR operations within Broadhaven Bay SAC.

From 24th June until 3rd July 2017, daily watches were also conducted for marine mammals by one MMO aboard construction and survey vessel, *Subsea Viking*, which conducted multi-beam operations at the offshore Corrib field and on two occasions within the Broadhaven Bay SAC. Records from marine mammal observations during this period are presented in the Appendix of this report.

Sightings outside Irish waters are excluded from this report. Previous survey sightings from the corresponding months of preceding years are included for historical context only, as the durations, locations and hours of effort vary between months and years. A selection of the best project photographs will be provided in the final (annual) report

2.2 Sightings

During June, sightings comprised the categories: *common dolphin*, *bottlenose dolphin*, *Risso's dolphin*, *unidentified dolphin*, and *grey seal*.

During June, there were a total of fifteen (15) marine mammal sightings (comprising at least four different species): fourteen (14) in Broadhaven Bay Special Area of Conservation (SAC), zero (0) at the offshore Corrib field, and one (1) elsewhere in Irish waters during transit.

In previous years during June, effort at the offshore Corrib field resulted in three (3) sightings in 2016, six (6) sightings in 2012, and three (3) sightings in 2009. In Broadhaven Bay SAC, effort resulted in twenty four (24) sightings in 2013, six (6) sightings in 2012, and one (1) sighting in 2011.

During July, sightings comprised the categories: *long-finned pilot whale*, *common dolphin*, *bottlenose dolphin* and *unidentified dolphin*.

During July, there were a total of eight (8) marine mammal sightings (comprising four species): three (3) in Broadhaven Bay SAC and five (5) at the offshore Corrib field.

In previous years during July, effort at the Corrib field resulted in zero (0) sightings in 2016, four (4) sightings in 2015, two (2) sightings in 2014, three (3) sightings in 2013, two (2) sightings in 2012, and one (1) sighting in 2008.

In Broadhaven Bay SAC, effort resulted in twelve (12) sightings in 2015, two (2) sightings in 2014, three (3) sightings in 2013, two (2) sightings in 2012, and one (1) sighting in 2009.

2.3 Mitigation

Of the twenty three (23) sightings, only four (4) caused a delay to operations, as follows:

- During sighting 3 on 23/06/2017, one grey seal was observed 450 m from the nearshore survey vessel, *An Gearoidin*, during a pre-watch, and caused a delay of 98 minutes to multi-beam SONAR tests.
- During sighting 11 on 28/06/2017, thirty bottlenose dolphins were observed 450 m from the nearshore survey vessel, *An Gearoidin*, during pre-watch for multi-beam activities, and caused a delay of 29 minutes.
- During sightings 12 and 13 on 28/06/2017, four bottlenose dolphins and one grey seal were observed 400 m and 300 m respectively from the nearshore survey vessel, *An Gearoidin*, during pre-watch for multi-beam activities, and caused a combined (i.e. sequential) delay of 58 minutes to soft-start.

Sighting 1 did not require mitigation as the seals were hauled out and therefore in a different medium, so the sound source would not have affected these animals. Sightings 2, 4-10, 14, 15, 17, 18, and 20-23 did not require mitigation due to distance from source. Sighting 4 also occurred during soft-start procedure, whilst sightings 8-10 and 18-23 occurred whilst the source was fully operational. Sightings 14, 16 and 17 occurred whilst no sound sources were operational. Sighting 7 occurred during transit to Corrib.



APPENDIX 1 - MARINE MAMMAL OBSERVATIONS (INITIAL UMBILICAL & PIPELINE SURVEY 2017)



Summary of Marine Mammal Sightings in June and July 2017

Sighting	Date	Observer	Vessel	Species	Amount	Range (m)	Lat		Long		Mitigation Required	Activity of vessel
							Deg	Min	Deg	Min		
1	23/06/2017	CO	SV	GS	4	600	54	15.20	9	53.50	N	Pre-watch, no mitigation required as seals hauled out
2	23/06/2017	CO	SV	GS	4	600	54	15.20	9	53.50	N	Pre-watch, no mitigation required due to distance from vessel
3	23/06/2017	CO	SV	GS	1	450	54	15.20	9	53.50	Y	Pre-watch, no mitigation required due to distance from vessel
4	23/06/2017	CO	SV	GS	2	600	54	15.20	9	53.50	N	Pre-watch, no mitigation required due to distance from vessel
5	23/06/2017	CO	SV	GS	1	600	54	15.20	9	53.50	N	Multibeam SONAR tests at pier
6	23/06/2017	CO	SV	GS	1	500	54	15.20	9	53.50	N	Multibeam SONAR tests at pier
7	26/06/2017	MT	CV	RD	10	820	55	23.18	9	27.10	N	Transit from Nelson to Corrib
8	27/06/2017	CO	SV	CD	6	600	54	17.75	9	55.01	N	Fully operational in Broadhaven SAC
9	27/06/2017	MT	CV	BD	20	1800	54	18.48	9	56.52	N	Fully operational within Broadhaven SAC
10	27/06/2017	MT	CV	UD	10	800	54	18.60	9	56.81	N	Fully operational within Broadhaven SAC
11	28/06/2017	CO	SV	BD	30	450	54	17.28	9	54.48	Y	Pre-watch for multibeam SONAR survey
12	28/06/2017	CO	SV	BD	4	400	54	17.18	9	51.33	Y	Pre-watch for multibeam SONAR survey
13	28/06/2017	CO	SV	GS	1	300	54	17.10	9	50.35	Y	Pre-watch for multibeam SONAR survey
14	28/06/2017	MT	CV	UD	1	600	54	20.24	10	8.21	N	Prior to operations within Broadhaven Bay SAC
15	28/06/2017	MT	CV	BD	10	1100	54	16.98	9	52.30	N	Pre-watch, no mitigation required due to distance from vessel
16	01/07/2017	CO	SV	BD	6	50	54	16.55	9	52.43	N	Not operational
17	01/07/2017	CO	SV	BD	6	700	54	15.55	9	52.88	N	Not operational
18	01/07/2017	MT	CV	LP	5	520	54	20.99	10	41.4	N	Fully operational outside Broadhaven SAC
19	01/07/2017	MT	CV	LP	8	10	54	21	10	41.79	N	Fully operational outside Broadhaven SAC
20	01/07/2017	MT	CV	LP	3	2000	54	19.21	11	4.3	N	Fully operational outside Broadhaven SAC
21	03/07/2017	CO	SV	UD	1	700	54	17.24	9	51.44	N	Fully operational within Broadhaven SAC
22	03/07/2017	MT	CV	CD	30	2500	54	20.31	11	3.48	N	Fully operational outside Broadhaven SAC
23	03/07/2017	MT	CV	LP	7	1000	54	20.23	11	3.51	N	Fully operational outside Broadhaven SAC

Acronym

CO: Clare Owen (MMO)

MT: Myrto Tourgeli-Provata (MMO)

SV: nearshore survey vessel (*An Gearoidin*)

CS: ROV construction and survey vessel (*Subsea Viking*)

CD: common dolphin (*Delphinus delphis*)

BD: bottlenose dolphin (*Tursiops truncatus*)

RD: Risso's dolphin (*Grampus griseus*)

UD: unidentified dolphin

GS: grey seal (*Halichoerus grypus*)

LP: long-finned pilot whale (*Globicephala melas*)



Field Notes

Sighting 1: on 23/06/2017, four grey seals were hauled out on a sand spit near Ballyglass pier, 500 m from the nearshore survey vessel, *An Gearoidin*, during a pre-watch, but since the seals were hauled out, no mitigation was required.

Sighting 2: on 23/06/2017, four grey seals were observed 600 m from the nearshore survey vessel, *An Gearoidin*, during a pre-watch, but since the seals were >500 m distance, no mitigation was required.

Sighting 3: on 23/06/2017, one grey seal was observed 450 m from the nearshore survey vessel, *An Gearoidin*, during a pre-watch, and caused a delay of 98 minutes to multi-beam SONAR tests.

Sighting 4: on 23/06/2017, two grey seals were observed, 600 m from the nearshore survey vessel, *An Gearoidin*, during a soft-start of the multi-beam SONAR.

Sighting 5: on 23/06/2017, one grey seal was observed, 600 m from the nearshore survey vessel, *An Gearoidin*, during multibeam SONAR tests.

Sighting 6: on 23/06/2017, one grey seal was observed, 600 m from the nearshore survey vessel, *An Gearoidin*, during multibeam SONAR tests.

Sighting 7: on 26/06/2017, ten Risso's dolphins were observed 820 m from the offshore survey vessel, *Subsea Viking*, whilst on transit to Corrib.

Sighting 8: on 27/06/2017, six common dolphins were observed 400 m from the nearshore survey vessel, *An Gearoidin*, whilst the multi-beam SONAR was active.

Sighting 9: on 27/06/2017, twenty bottlenose dolphins were observed 1800 m from the offshore survey vessel, *Subsea Viking*, during operations in Broadhaven Bay, SAC.

Sighting 10: on 27/06/2017, ten unidentified dolphins were observed 800 m from the offshore survey vessel, *Subsea Viking*, during operations in Broadhaven Bay, SAC.

Sighting 11: on 28/06/2017, thirty bottlenose dolphins were observed 450 m from the nearshore survey vessel, *An Gearoidin*, during pre-watch for multi-beam SONAR activities, and caused a delay of 29 minutes.



Sighting 12: on 28/06/2017, four bottlenose dolphins were observed 400 m from the nearshore survey vessel, *An Gearoidin*, during pre-watch for multi-beam SONAR activities, and caused a delay to soft-start.

Sighting 13: on 28/06/2017, one grey seal was observed 300 m from the nearshore survey vessel, *An Gearoidin*, during pre-watch for multi-beam SONAR activities, and caused a delay to soft-start.

Sighting 14: on 28/06/2017, one unidentified dolphin was observed 600 m from the offshore survey vessel, *Subsea Viking*, prior to onset of operations in Broadhaven Bay, SAC, but no mitigation was required.

Sighting 15: on 28/06/2017, ten bottlenose dolphins were observed 1100 m from the offshore survey vessel, *Subsea Viking*, during a pre-watch in Broadhaven Bay, SAC, but no mitigation was required.

Sighting 16: on 01/07/2017, six bottlenose dolphins were observed 50 m from the nearshore survey vessel, *An Gearoidin*, however no sound sources were operational so no mitigation was required.

Sighting 17: on 01/07/2017, six bottlenose dolphins were observed 700 m from the nearshore survey vessel, *An Gearoidin*, however no sound sources were operational so no mitigation was required.

Sighting 18: 01/07/2017, five long-finned pilot whales were observed 520 m from the offshore survey vessel, *Subsea Viking*, during a pre-watch outside Broadhaven Bay, SAC, but no mitigation action was required.

Sighting 19: 01/07/2017, eight long-finned pilot whales were observed 10 m from the offshore survey vessel, *Subsea Viking*, outside Broadhaven Bay, SAC, but no mitigation action was required.

Sighting 20: on 03/07/2017, three long-finned pilot whales were observed 2000 m from the offshore survey vessel, *Subsea Viking*, outside Broadhaven Bay, SAC, no mitigation action was required.

Sighting 21: on 01/07/2017, one unidentified dolphin was observed 700 m from the nearshore survey vessel, *An Gearoidin*, however source was fully operational so no mitigation was required.

Sighting 22: on 03/07/2017, approximately 30 common dolphins were observed 2500 m from the offshore survey vessel, *Subsea Viking*, outside Broadhaven Bay, SAC, no mitigation was required.



Sighting 23: on 03/07/2017, seven long-finned pilot whales were observed 1000 m from the offshore survey vessel, *Subsea Viking*, outside Broadhaven Bay, SAC, no mitigation was required.

Sightings Form – Au Gearoidin

Regulatory reference number	Ship/platform name	Sighting number	Acoustic detection number	Date	Time at start of encounter (UTC)	Time at end of encounter (UTC)	Were animals detected visually and/or acoustically?	How were the animals first detected?	Observer's/ operator's name	Position degrees latitude	Position minutes latitude	Position north/south	Position degrees longitude	Position minutes longitude	Position east/west	Water depth (metres)	Species or species group	Description (visual sighting only)	Bearing to animal	Range of animal (metres)	Total number	Number of adults (visual sightings only)	Number of calves (visual sightings only)	Behaviour (visual sightings only)	Direction of travel (relative to ship)	Direction of travel (compass pointing)	Argun/ source activity when animals first detected	Argun/ source activity when animals last detected	Closest distance of animals from argun/ source (metres)	Time of closest approach (UTC)	First observed distance during soft start (if relevant) (metres)	Closest observed distance during soft start (if relevant) (metres)	Last observed distance during soft start (if relevant) (metres)	What action was taken?	Length of power down or shut-down (if relevant) (min)	Estimated loss of production (if relevant) (due to mitigating actions taken)	Comments	Flag record					
WCC-9914	Air Gearoidin	1		23/06/2017	8:27	9:10	✓	Chant Owen	54	15.20	N	0	53.02	0	53.02	3.0	Halichoerus grypus	dark body, poorly nose. Hauled out on sand flat		180	800	4	4	Observed out	E	Nor	n	n	500	0:47													
WCC-9914	Air Gearoidin	2		23/06/2017	9:20	9:45	✓	Chant Owen	54	15.20	N	0	53.02	0	53.02	3.0	Halichoerus grypus	dark body, poorly nose.		170	600	4	4	Swimming	E	Nor	n	n	400	0:25													
WCC-9914	Air Gearoidin	3		23/06/2017	10:00	11:21	✓	Chant Owen	54	15.20	N	0	53.02	0	53.02	3.0	Halichoerus grypus	dark body, poorly nose.		180	800	1	1	Drifting	E	Nor	n	n	400	10:35													
WCC-9914	Air Gearoidin	4		23/06/2017	11:50	12:54	✓	Chant Owen	54	15.20	N	0	53.02	0	53.02	3.0	Halichoerus grypus	dark body, poorly nose.		180	800	2	2	Swimming	E	Nor	n	n	400	12:29	000	000	000										
WCC-9914	Air Gearoidin	5		23/06/2017	12:03	12:15	✓	Chant Owen	54	15.20	N	0	53.02	0	53.02	3.0	Halichoerus grypus	dark body, poorly nose.		170	600	1	1	Hauled out	E	Nor	n	n	600	12:03													
WCC-9914	Air Gearoidin	6		23/06/2017	13:33	13:24	✓	Chant Owen	54	15.20	N	0	53.02	0	53.02	3.0	Halichoerus grypus	dark body, poorly nose.		180	800	1	1	Drifting	E	Nor	n	n	500	13:30													
WCC-9914	Air Gearoidin	7		23/06/2017	11:14	11:23	✓	Chant Owen	54	17.75	N	0	05.01	0	05.01	3.0	Common dolphin	Dark, some dorsal fin, hourglass pattern		25	400	1	1	Drifting	E	Nor	n	n	400	11:23													
WCC-9914	Air Gearoidin	8		28/06/2017	8:18	8:37	✓	Chant Owen	54	17.28	N	0	54.48	0	54.48	34.1	Fusages truncatus	Dolphin, grey body		30	400	30	30	Drifting	E	Nor	n	n	400	8:18													
WCC-9914	Air Gearoidin	9		28/06/2017	10:18	10:23	✓	Chant Owen	54	17.18	N	0	51.32	0	51.32	11.0	Fusages truncatus	Dolphin, grey body		30	400	4	4	Drifting	E	Nor	n	n	400	10:18													
WCC-9914	Air Gearoidin	10		28/06/2017	10:46	10:50	✓	Chant Owen	54	17.04	N	0	50.38	0	50.38	10.0	Halichoerus grypus	dark body, poorly nose.		180	300	1	1	Drifting	E	Nor	n	n	300	10:46													
WCC-9914	Air Gearoidin	11		03/07/2017	6:30	8:43	✓	Chant Owen	54	16.65	N	0	12.43	0	12.43	22.0	Fusages truncatus	Dolphin, grey body		180	150	6	6	Behaviour on sunny vessel	E	Nor	n	n	1	0:35													
WCC-9914	Air Gearoidin	12		03/07/2017	10:18	10:18	✓	Chant Owen	54	16.54	N	0	12.88	0	12.88	14.7	Fusages truncatus	Dolphin, grey body		90	700	6	6	Drifting	E	Nor	n	n	700	10:18													
WCC-9914	Air Gearoidin	13		03/07/2017	9:21	9:22	✓	Chant Owen	54	17.44	N	0	11.44	0	11.44	22.0	Unidentified dolphin	Dark body		50	700	1	1	Drifting	E	Nor	n	n	700	9:21													

Sightings Form – Subsea Viking

Regulatory reference number	Ship/platform name	Sighting number	Acoustic detection number	Date	Time at start of encounter (UTC)	Time at end of encounter (UTC)	Were animals detected visually and/or acoustically?	How were the animals first detected?	Observer's/ operator's name	Position degrees latitude	Position minutes latitude	Position north/south	Position degrees longitude	Position minutes longitude	Position east/west	Water depth (metres)	Species or species group	Description (visual sighting only)	Bearing to animal	Range of animal (metres)	Total number	Number of adults (visual sightings only)	Number of calves (visual sightings only)	Behaviour (visual sightings only)	Direction of travel (relative to ship)	Direction of travel (compass pointing)	Argun/ source activity when animals first detected	Argun/ source activity when animals last detected	Closest distance of animals from argun/ source (metres)	Time of closest approach (UTC)	First observed distance during soft start (if relevant) (metres)	Closest observed distance during soft start (if relevant) (metres)	Last observed distance during soft start (if relevant) (metres)	What action was taken?	Length of power down or shut-down (if relevant) (min)	Estimated loss of production (if relevant) (due to mitigating actions taken)	Comments	Flag record											
E10097	Subsea Viking	1		22/06/2017	18:46	18:53	✓	Mylio Toural Proxata	57	30.81	N	1	16.20	0	16.20	118.0	Possible white beaked dolphin	strong white coloration at the sides	20	700	1	0	0	Swimming in different directions a ball	E	S	n	n																					
E10097	Subsea Viking	2		22/06/2017	19:38	19:38	✓	Mylio Toural Proxata	57	31.83	N	0	58.31	0	58.31	118.0	Unidentified dolphin		20	300	2	2	Close swimming	E	S	n	n																						
E10097	Subsea Viking	3		25/06/2017	22:46	20:46	✓	Mylio Toural Proxata	58	4.74	N	0	58.7	0	58.7	296	160.0	Unidentified dolphins		200	300	2	2	slow swimming	E	S	n	n																					
E10097	Subsea Viking	4		26/06/2017	07:21	07:21	✓	Mylio Toural Proxata	58	30.38	N	0	48.20	0	48.20	118.0	Possible Bottlenose dolphins		200	800	4	4	slow swimming	E	S	n	n																						
E10097	Subsea Viking	5		26/06/2017	07:40	07:46	✓	Mylio Toural Proxata	58	27.01	N	0	52.00	0	52.00	160.0	Unidentified dolphins	A white coloration at the front of the fin	210	600	4	4	swimming slow	E	S	n	n																						
E10097	Subsea Viking	6		26/06/2017	08:01	08:22	✓	Mylio Toural Proxata	58	22.08	N	0	58.69	0	58.69	174.0	Unidentified dolphins		200	1300	2	0	swimming slow	E	S	n	n																						
E10097	Subsea Viking	7		26/06/2017	08:50	08:52	✓	Mylio Toural Proxata	58	18.53	N	0	44.00	0	44.00	176.0	White beaked dolphins	white coloration at the front of the fin	270	900	1	4	1 slow swimming	E	var	n	n																						
E10097	Subsea Viking	8		26/06/2017	08:55	08:59	✓	Mylio Toural Proxata	58	18.53	N	0	34.00	0	34.00	118.0	beluga fish		180	100	1	1	swimming fast towards vessel	E	var	n	n																						
E10097	Subsea Viking	9		26/06/2017	08:55	08:57	✓	Mylio Toural Proxata	58	17.88	N	0	43.00	0	43.00	160.0	White beaked dolphins	white coloration at the front of the fin	210	700	1	1	swimming fast	E	var	n	n																						
E10097	Subsea Viking	10		26/06/2017	08:55	08:56	✓	Mylio Toural Proxata	58	17.88	N	0	43.00	0	43.00	160.0	white whale	large body small fin at the back part	300	500	1	1	swimming slow	E	var	n	n																						
E10097	Subsea Viking	11		26/06/2017	14:51	14:58	✓	Mylio Toural Proxata	58	23.18	N	0	27.10	0	27.10	118.0	risso's dolphins	whirl coloration, scratches and tail	340	800	10	0	0	breaching and swimming fast	E	var	n	n																					
E10097	Subsea Viking	12		27/06/2017	13:40	13:55	✓	Mylio Toural Proxata	54	16.48	N	0	58.50	0	58.50	30.0	Possible Bottlenose dolphins	big body	110	1800	20	20	swimming fast breaching	E	var	n	n		1800	13:45																			
E10097	Subsea Viking	13		27/06/2017	14:30	14:31	✓	Mylio Toural Proxata	54	16.60	N	0	58.10	0	58.10	45.0	Unidentified dolphins		45	800	10	10	swimming fast	E	S	n	n		800	14:30																			
E10097	Subsea Viking	14		28/06/2017	09:00	09:03	✓	Mylio Toural Proxata	54	20.24	N	0	8.21	0	8.21	45.0	Unidentified dolphins		45	600	17	1	slow swimming	E	S	n	n		600																				
E10097	Subsea Viking	15		28/06/2017	10:00	10:20	✓	Mylio Toural Proxata	54	16.88	N	0	52.30	0	52.30	41.0	Bottlenose dolphins	big body, dark colorations and big fin	35	1100	6	0	0	swimming at the sides of the boat, ball	E	S	n	n		1100	10:00	1100	1100	2000															
E10097	Subsea Viking	16		01/07/2017	08:10	08:30	✓	Mylio Toural Proxata	54	20.99	N	0	41.40	0	41.40	211.0	Long-finned pilot whales	wide fin and robust body with clear	90	500	0	0	0	houring slow	E	S	n	n		500																			
E10097	Subsea Viking	17		01/07/2017	07:50	07:54	✓	Mylio Toural Proxata	54	21.00	N	0	41.10	0	41.10	160	Long-finned pilot whales	wide fin and robust body with clear	160	200	0	0	0	swimming slow around the ship	E	S	n	n		200	07:51																		
E10097	Subsea Viking	18		01/07/2017	07:55	07:58	✓	Mylio Toural Proxata	54	21.00	N	0	43.30	0	43.30	330.0	Long-finned pilot whales	wide fin and robust body with clear	330	2000	3	3	swimming fast	E	S	n	n		2000	07:55																			
E10097	Subsea Viking	19		03/07/2017	13:40	14:08	✓	Mylio Toural Proxata	54	20.31	N	0	11.34	0	11.34	340.0	Common dolphins	wide fin and robust body with clear	330	2000	30	30	swimming fast, breaching	E	S	n	n		1300	02:08																			
E10097	Subsea Viking	20		03/07/2017	14:10	14:12	✓	Mylio Toural Proxata	54	20.32	N	0	11.34																																				

Effort Form – Au Gearoidin

Regulatory reference number	Ship/ platform name	Date	Visual watch or PAM?	Observer's / operator's name(s)	Time of start of watch (UTC)	Time of end of watch (UTC)	Start position - degrees latitude	Start position - minutes latitude	Start position - north/ south	Start position - degrees longitude	Start position - minutes longitude	Start position - east/ west	Depth of water at start position (metres)	End position - degrees latitude	End position - minutes latitude	End position - north/ south	End position - degrees longitude	End position - minutes longitude	End position - east/ west	Depth of water at end position (metres)	Speed of vessel (knots)	Source activity	Wind direction	Wind force (Beaufort)	Sea state	Swell	Visibility (visual watch only)	Sunglare (visual watch only)	Comments	Flag record
WCC-9914	An Gearoidin	21/06/2017	v	Clare Owen	14:19	15:18	54	16.10	n	9	52.71	w	24.0	54	17.00	n	9	49.00	w	4.5	6.2	n	sw	3	0	g	n			
WCC-9914	An Gearoidin	21/06/2017	v	Clare Owen	15:18	16:19	54	17.00	n	9	49.00	w	4.5	54	15.11	n	9	53.29	w	3.0	0.0	n	sw	3	0	g	n			
WCC-9914	An Gearoidin	23/06/2017	v	Clare Owen	8:37	9:32	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	sw	3	0	m	n		Test of multi-beam SONAR at pier	
WCC-9914	An Gearoidin	23/06/2017	v	Clare Owen	9:32	10:08	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	sw	3	0	m	w		Test of multi-beam SONAR at pier	
WCC-9914	An Gearoidin	23/06/2017	v	Clare Owen	10:08	11:04	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	sw	3	0	m	n		Test of multi-beam SONAR at pier	
WCC-9914	An Gearoidin	23/06/2017	v	Clare Owen	11:04	11:53	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	sw	2	0	m	v		Test of multi-beam SONAR at pier	
WCC-9914	An Gearoidin	23/06/2017	v	Clare Owen	11:53	12:13	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	sw	2	0	m	v		Test of multi-beam SONAR at pier	
WCC-9914	An Gearoidin	23/06/2017	v	Clare Owen	12:13	12:57	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	sw	3	0	m	v		Test of multi-beam SONAR at pier	
WCC-9914	An Gearoidin	23/06/2017	v	Clare Owen	12:51	13:05	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	sw	3	0	m	n		Test of multi-beam SONAR at pier	
WCC-9914	An Gearoidin	23/06/2017	v	Clare Owen	13:05	13:32	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	sw	3	0	m	n		Test of multi-beam SONAR at pier	
WCC-9914	An Gearoidin	26/06/2017	v	Clare Owen	8:53	9:33	54	15.18	n	9	53.48	w	4.9	54	17.19	n	9	51.11	w	21.4	4.4	n	n	2	0	m	g	n		
WCC-9914	An Gearoidin	26/06/2017	v	Clare Owen	9:33	9:55	54	17.19	n	9	51.11	w	21.4	54	17.28	n	9	51.31	w	23.5	0.7	n	n	2	0	m	g	n		
WCC-9914	An Gearoidin	26/06/2017	v	Clare Owen	9:55	10:49	54	17.29	n	9	51.31	w	23.5	54	17.15	n	9	51.88	w	24.0	1.0	n	n	2	0	m	g	n		
WCC-9914	An Gearoidin	26/06/2017	v	Clare Owen	10:48	11:38	54	17.15	n	9	51.58	w	24.0	54	18.00	n	9	51.11	w	16.0	0.0	n	n	2	0	m	g	n		
WCC-9914	An Gearoidin	26/06/2017	v	Clare Owen	11:38	11:45	54	18.00	n	9	51.11	w	16.0	54	18.00	n	9	51.11	w	16.0	1.0	n	n	2	0	m	g	n		heavy rain
WCC-9914	An Gearoidin	26/06/2017	v	Clare Owen	11:45	12:09	54	18.00	n	9	51.11	w	16.0	54	18.00	n	9	51.11	w	16.0	1.0	n	n	2	0	m	g	n		heavy rain
WCC-9914	An Gearoidin	26/06/2017	v	Clare Owen	12:30	13:00	54	16.83	n	9	52.30	w	23.0	54	17.19	n	9	50.94	w	15.0	5.0	n	n	3	0	m	g	n		
WCC-9914	An Gearoidin	26/06/2017	v	Clare Owen	13:00	13:20	54	17.19	n	9	50.94	w	15.0	54	17.05	n	9	51.05	w	15.0	0.0	n	n	3	0	m	n			
WCC-9914	An Gearoidin	26/06/2017	v	Clare Owen	13:20	14:12	54	17.05	n	9	52.38	w	25.0	54	17.07	n	9	51.79	w	17.4	0.0	n	n	3	0	m	n			
WCC-9914	An Gearoidin	26/06/2017	v	Clare Owen	14:12	15:04	54	17.07	n	9	51.22	w	17.4	54	17.48	n	9	53.93	w	32.1	0.0	n	n	3	0	m	n			
WCC-9914	An Gearoidin	26/06/2017	v	Clare Owen	15:04	16:03	54	17.48	n	9	53.93	w	32.1	54	17.24	n	9	54.48	w	32.5	0.0	n	n	3	0	m	n			
WCC-9914	An Gearoidin	26/06/2017	v	Clare Owen	16:03	16:54	54	17.24	n	9	54.48	w	32.5	54	17.28	n	9	54.51	w	34.0	4.0	n	n	3	0	m	n			
WCC-9914	An Gearoidin	27/06/2017	v	Clare Owen	9:10	9:40	54	15.28	n	9	53.32	w	11.5	54	17.23	n	9	54.65	w	34.2	6.1	n	ne	2	0	m	n			
WCC-9914	An Gearoidin	27/06/2017	v	Clare Owen	9:40	10:26	54	17.33	n	9	54.65	w	34.2	54	17.33	n	9	54.46	w	34.1	0.6	n	ne	2	0	m	n			
WCC-9914	An Gearoidin	27/06/2017	v	Clare Owen	10:00	10:45	54	17.33	n	9	54.46	w	34.1	54	17.27	n	9	54.43	w	32.9	0.0	n	ne	2	0	m	n			
WCC-9914	An Gearoidin	27/06/2017	v	Clare Owen	10:45	11:41	54	17.27	n	9	54.43	w	32.9	54	17.66	n	9	55.02	w	37.2	4.1	n	ne	2	0	m	g	w		
WCC-9914	An Gearoidin	27/06/2017	v	Clare Owen	11:41	11:54	54	17.66	n	9	55.02	w	37.2	54	17.66	n	9	55.02	w	37.2	0.5	n	ne	2	0	m	g	w		
WCC-9914	An Gearoidin	27/06/2017	v	Clare Owen	11:59	12:30	54	17.66	n	9	55.02	w	37.2	54	17.60	n	9	55.84	w	37.9	0.0	n	ne	3	0	m	g	v		
WCC-9914	An Gearoidin	27/06/2017	v	Clare Owen	12:30	13:03	54	17.60	n	9	55.84	w	37.9	54	17.49	n	9	55.96	w	36.7	0.0	n	ne	3	0	m	n			heavy rain
WCC-9914	An Gearoidin	27/06/2017	v	Clare Owen	13:03	13:50	54	17.49	n	9	55.96	w	36.7	54	17.28	n	9	55.30	w	34.2	0.0	n	ne	3	0	m	n			heavy rain
WCC-9914	An Gearoidin	27/06/2017	v	Clare Owen	13:50	14:41	54	17.28	n	9	55.30	w	34.2	54	17.25	n	9	54.37	w	31.1	4.0	n	ne	2	0	m	n			heavy rain
WCC-9914	An Gearoidin	27/06/2017	v	Clare Owen	14:41	15:26	54	17.25	n	9	54.37	w	31.1	54	17.17	n	9	54.42	w	31.1	0.0	n	ne	2	0	m	n			
WCC-9914	An Gearoidin	28/06/2017	v	Clare Owen	7:49	8:18	54	17.25	n	9	54.49	w	34.0	54	17.28	n	9	54.48	w	34.1	0.0	n	e	2	0	m	n			
WCC-9914	An Gearoidin	28/06/2017	v	Clare Owen	8:18	8:53	54	17.28	n	9	54.48	w	34.1	54	17.42	n	9	54.49	w	35.8	0.0	n	e	2	0	m	n			
WCC-9914	An Gearoidin	28/06/2017	v	Clare Owen	8:53	9:13	54	17.42	n	9	54.49	w	35.8	54	17.26	n	9	54.41	w	33.4	0.0	n	e	2	0	m	n			
WCC-9914	An Gearoidin	28/06/2017	v	Clare Owen	9:13	9:29	54	17.26	n	9	54.41	w	33.4	54	17.10	n	9	52.38	w	29.4	0.0	n	e	2	0	m	n			
WCC-9914	An Gearoidin	28/06/2017	v	Clare Owen	9:33	10:02	54	17.10	n	9	52.38	w	29.4	54	17.14	n	9	52.18	w	24.1	0.0	n	e	2	0	m	n			
WCC-9914	An Gearoidin	28/06/2017	v	Clare Owen	10:02	10:46	54	17.14	n	9	52.18	w	24.1	54	17.10	n	9	50.35	w	10.7	4.0	n	e	2	0	m	n			
WCC-9914	An Gearoidin	28/06/2017	v	Clare Owen	10:46	11:16	54	17.10	n	9	50.35	w	10.7	54	17.03	n	9	49.79	w	3.3	4.0	n	e	2	0	m	n			
WCC-9914	An Gearoidin	28/06/2017	v	Clare Owen	11:16	11:36	54	17.03	n	9	49.79	w	3.3	54	17.00	n	9	49.92	w	3.6	0.0	n	e	2	0	m	n			
WCC-9914	An Gearoidin	28/06/2017	v	Clare Owen	11:36	11:44	54	17.00	n	9	49.92	w	3.6	54	17.01	n	9	49.32	w	3.6	0.0	n	e	2	0	m	n			
WCC-9914	An Gearoidin	28/06/2017	v	Clare Owen	11:44	12:37	54	17.01	n	9	49.32	w	3.6	54	17.07	n	9	51.79	w	24.0	4.3	n	e	2	0	m	g	v		
WCC-9914	An Gearoidin	28/06/2017	v	Clare Owen	12:37	13:30	54	17.07	n	9	51.79	w	24.0	54	15.89	n	9	51.88	w	20.0	5.0	n	n	3	0	m	v			
WCC-9914	An Gearoidin	28/06/2017	v	Clare Owen	13:30	13:45	54	15.89	n	9	51.88	w	20.0	54	17.04	n	9	51.19	w	16.0	5.0	n	n	4	0	m	v			
WCC-9914	An Gearoidin	28/06/2017	v	Clare Owen	13:45	14:46	54	17.04	n	9	51.19	w	16.0	54	18.99	n	9	50.10	w	7.0	0.0	n	ne	4	0	m	v			
WCC-9914	An Gearoidin	28/06/2017	v	Clare Owen	14:46	15:07	54	18.99	n	9	50.10	w	7.0	54	17.92	n	9	51.40	w	18.8	0.0	n	ne	4	0	m	w			
WCC-9914	An Gearoidin	28/06/2017	v	Clare Owen	15:07	16:12	54	17.32	n	9	51.40	w	18.8	54	17.10	n	9	51.45	w	16.0	0.0	n	ne	4	0	m	w			
WCC-9914	An Gearoidin	28/06/2017	v	Clare Owen	16:12	16:36	54	17.10	n	9	51.45	w	16.0	54	17.11	n	9	51.70	w	18.0	5.0	n	ne	4	0	m	g	v		
WCC-9914	An Gearoidin	29/06/2017	v	Clare Owen	10:58	11:30	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	w	5	0	m	g	n		Test of pinger at pier
WCC-9914	An Gearoidin	29/06/2017	v	Clare Owen	11:30	11:53	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	w	5	0	m	g	n		Test of pinger at pier
WCC-9914	An Gearoidin	01/07/2017	v	Clare Owen	8:49	9:21	54	17.05	n	9	50.62	w	14.0	54	17.36	n	9	50.11	w	6.9	0.0	n	w	4	0	m	n			
WCC-9914	An Gearoidin	01/07/2017	v	Clare Owen	9:21	9:41	54	17.36	n	9	50.11	w	6.9	54	17.07	n	9	50.34												

Regulatory reference number	Ship/platform name	Date	Visual watch or PAM?	Observer's / operator's name(s)	Time of start of watch (UTC)	Time of end of watch (UTC)	Start position - degrees latitude	Start position - minutes latitude	Start position - north/south	Start position - degrees longitude	Start position - minutes longitude	Start position - east/west	Start position - degrees latitude	End position - degrees latitude	End position - minutes latitude	End position - north/south	End position - degrees longitude	End position - minutes longitude	End position - east/west	Depth of water at start position (metres)	End position - degrees latitude	End position - minutes latitude	End position - north/south	End position - degrees longitude	End position - minutes longitude	End position - east/west	Depth of water at end position (metres)	Speed of vessel (knots)	Source activity	Wind direction	Wind force (Beaufort)	Sea state	Swell	Visibility (visual watch only)	Sunglare (visual watch only)	Comments	Flag record	
WCC-9914	An Georoidin	21/06/2017	v	Clare Owen	14:19	15:18	54	16.10	n	9	52.71	w	24.0	54	17.00	n	9	49.00	w	4.5	6.2	n	sw	3	s	o	g	n										
WCC-9914	An Georoidin	21/06/2017	v	Clare Owen	15:18	16:19	54	17.00	n	9	49.00	w	4.5	54	15.11	n	9	53.29	w	3.0	0.0	n	sw	3	s	o	g	n										
WCC-9914	An Georoidin	23/06/2017	v	Clare Owen	8:37	9:32	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	sw	3	s	o	m	n									Test of multi-beam SONAR at pier	
WCC-9914	An Georoidin	23/06/2017	v	Clare Owen	9:32	10:08	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	sw	3	s	o	m	w									Test of multi-beam SONAR at pier	
WCC-9914	An Georoidin	23/06/2017	v	Clare Owen	10:08	11:04	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	sw	3	s	o	m	n									Test of multi-beam SONAR at pier	
WCC-9914	An Georoidin	23/06/2017	v	Clare Owen	11:04	11:53	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	sw	2	s	o	m	v									Test of multi-beam SONAR at pier	
WCC-9914	An Georoidin	23/06/2017	v	Clare Owen	11:53	12:13	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	sw	2	s	o	m	v									Test of multi-beam SONAR at pier	
WCC-9914	An Georoidin	23/06/2017	v	Clare Owen	12:13	12:57	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	sw	3	s	o	m	v									Test of multi-beam SONAR at pier	
WCC-9914	An Georoidin	23/06/2017	v	Clare Owen	12:51	13:05	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	sw	3	s	o	m	n									Test of multi-beam SONAR at pier	
WCC-9914	An Georoidin	23/06/2017	v	Clare Owen	13:05	13:32	54	15.20	n	9	53.50	w	3.0	54	15.20	n	9	53.50	w	3.0	0.0	n	sw	3	s	o	m	n									Test of multi-beam SONAR at pier	
WCC-9914	An Georoidin	26/06/2017	v	Clare Owen	8:53	9:33	54	15.18	n	9	53.48	w	4.9	54	17.19	n	9	51.11	w	21.4	4.4	n	2	g	m	g	n											
WCC-9914	An Georoidin	26/06/2017	v	Clare Owen	9:33	9:55	54	17.19	n	9	51.11	w	21.4	54	17.29	n	9	51.31	w	23.5	0.7	n	2	g	m	g	n											
WCC-9914	An Georoidin	26/06/2017	v	Clare Owen	9:55	10:48	54	17.29	n	9	51.31	w	23.5	54	17.15	n	9	51.68	w	24.0	1.0	n	2	g	m	g	n											
WCC-9914	An Georoidin	26/06/2017	v	Clare Owen	10:48	11:38	54	17.15	n	9	51.68	w	24.0	54	18.00	n	9	51.11	w	16.0	0.0	n	2	g	m	g	n											
WCC-9914	An Georoidin	26/06/2017	v	Clare Owen	11:38	11:45	54	18.00	n	9	51.11	w	16.0	54	18.00	n	9	51.11	w	16.0	1.0	n	2	g	m	g	n										heavy rain	
WCC-9914	An Georoidin	26/06/2017	v	Clare Owen	11:45	12:09	54	18.00	n	9	51.11	w	16.0	54	18.00	n	9	51.11	w	16.0	1.0	n	2	g	m	g	n										heavy rain	
WCC-9914	An Georoidin	26/06/2017	v	Clare Owen	12:30	13:00	54	16.83	n	9	52.30	w	23.0	54	17.19	n	9	50.94	w	15.0	5.0	n	3	s	m	g	n											
WCC-9914	An Georoidin	26/06/2017	v	Clare Owen	13:00	13:20	54	17.19	n	9	50.94	w	15.0	54	17.05	n	9	52.38	w	25.0	0.0	n	3	s	m	m	n											
WCC-9914	An Georoidin	26/06/2017	v	Clare Owen	13:20	14:12	54	17.05	n	9	52.38	w	25.0	54	17.07	n	9	51.22	w	17.4	0.0	n	3	s	m	m	n											
WCC-9914	An Georoidin	26/06/2017	v	Clare Owen	14:12	15:04	54	17.07	n	9	51.22	w	17.4	54	17.48	n	9	53.93	w	32.1	0.0	n	3	s	m	m	n											
WCC-9914	An Georoidin	26/06/2017	v	Clare Owen	15:04	16:03	54	17.48	n	9	53.93	w	32.1	54	17.24	n	9	54.48	w	32.5	0.0	n	3	s	m	m	n											
WCC-9914	An Georoidin	26/06/2017	v	Clare Owen	16:03	16:54	54	17.24	n	9	54.48	w	32.5	54	17.26	n	9	54.51	w	34.0	4.0	n	3	s	m	m	n											
WCC-9914	An Georoidin	27/06/2017	v	Clare Owen	9:10	9:40	54	15.28	n	9	53.32	w	11.5	54	17.23	n	9	54.65	w	34.2	6.1	n	2	g	m	n												
WCC-9914	An Georoidin	27/06/2017	v	Clare Owen	9:40	10:00	54	17.23	n	9	54.65	w	34.2	54	17.33	n	9	54.46	w	34.1	0.0	n	3	s	o	m	n											
WCC-9914	An Georoidin	27/06/2017	v	Clare Owen	10:00	10:45	54	17.33	n	9	54.46	w	34.1	54	17.27	n	9	54.43	w	32.9	0.0	n	3	s	o	m	n											
WCC-9914	An Georoidin	27/06/2017	v	Clare Owen	10:45	11:41	54	17.27	n	9	54.43	w	32.9	54	17.66	n	9	55.02	w	37.2	4.1	n	2	g	o	g	w											
WCC-9914	An Georoidin	27/06/2017	v	Clare Owen	11:41	11:54	54	17.66	n	9	55.02	w	37.2	54	17.66	n	9	55.02	w	37.2	0.5	n	2	g	o	g	w											
WCC-9914	An Georoidin	27/06/2017	v	Clare Owen	11:54	12:39	54	17.66	n	9	55.02	w	37.2	54	17.66	n	9	55.94	w	37.9	0.0	n	3	s	o	g	v											
WCC-9914	An Georoidin	27/06/2017	v	Clare Owen	12:30	13:03	54	17.60	n	9	55.94	w	37.9	54	17.49	n	9	55.96	w	36.7	0.0	n	3	s	o	m	n										heavy rain	
WCC-9914	An Georoidin	27/06/2017	v	Clare Owen	13:03	13:50	54	17.49	n	9	55.96	w	36.7	54	17.28	n	9	55.30	w	34.2	0.0	n	3	s	o	p	n										heavy rain	
WCC-9914	An Georoidin	27/06/2017	v	Clare Owen	13:50	14:41	54	17.28	n	9	55.30	w	34.2	54	17.25	n	9	54.37	w	31.1	4.0	n	2	g	o	p	n										heavy rain	
WCC-9914	An Georoidin	27/06/2017	v	Clare Owen	14:41	15:26	54	17.25	n	9	54.37	w	31.1	54	17.17	n	9	54.42	w	31.1	0.0	n	2	g	o	m	n											
WCC-9914	An Georoidin	28/06/2017	v	Clare Owen	7:49	8:19	54	17.25	n	9	54.49	w	34.0	54	17.28	n	9	54.48	w	34.1	0.0	n	2	g	o	m	n											
WCC-9914	An Georoidin	28/06/2017	v	Clare Owen	8:19	8:53	54	17.28	n	9	54.48	w	34.1	54	17.42	n	9	54.49	w	35.8	0.0	n	2	g	o	m	n											
WCC-9914	An Georoidin	28/06/2017	v	Clare Owen	8:53	9:13	54	17.42	n	9	54.49	w	35.8	54	17.26	n	9	54.41	w	33.4	0.0	n	2	g	o	m	n											
WCC-9914	An Georoidin	28/06/2017	v	Clare Owen	9:13	9:28	54	17.26	n	9	54.41	w	33.4	54	17.10	n	9	52.38	w	29.4	0.0	n	2	g	o	m	n											
WCC-9914	An Georoidin	28/06/2017	v	Clare Owen	9:33	10:02	54	17.10	n	9	52.38	w	29.4	54	17.14	n	9	52.18	w	24.1	0.0	n	2	g	o	m	n											
WCC-9914	An Georoidin	28/06/2017	v	Clare Owen	10:02	10:46	54	17.14	n	9	52.18	w	24.1	54	17.10	n	9	50.35	w	10.7	4.0	n	2	g	o	m	n											
WCC-9914	An Georoidin	28/06/2017	v	Clare Owen	10:46	11:16	54	17.10	n	9	50.35	w	10.7	54	17.03	n	9	49.79	w	3.3	4.0	n	2	g	o	m	n											
WCC-9914	An Georoidin	28/06/2017	v	Clare Owen	11:16	11:36	54	17.03	n	9	49.79	w	3.3	54	17.00	n	9	49.92	w	3.6	0.0	n	2	g	o	g	n											
WCC-9914	An Georoidin	28/06/2017	v	Clare Owen	11:36	11:44	54	17.00	n	9	49.92	w	3.6	54	17.01	n	9	49.92	w	3.6	0.0	n	2	g	o	g	n											
WCC-9914	An Georoidin	28/06/2017	v	Clare Owen	11:44	12:37	54	17.01	n	9	49.92	w	3.6	54	17.07	n	9	51.79	w	24.0	4.3	n	2	g	o	g	v											
WCC-9914	An Georoidin	28/06/2017	v	Clare Owen	12:37	13:30	54	17.07	n	9	51.79	w	24.0	54	15.89	n	9	51.88	w	20.0	5.0	n	3	s	o	m	v											
WCC-9914	An Georoidin	28/06/2017	v	Clare Owen	13:30	13:45	54	15.89	n	9	51.88	w	20.0	54	17.04	n	9	51.19	w	16.0	5.0	n	4	s	o	m	v											
WCC-9914	An Georoidin	28/06/2017	v	Clare Owen	13:45	14:46	54	17.04	n	9	51.19	w	16.0	54	16.99	n	9	50.10	w	7.0	0.0	n	4	s	o	m	v											
WCC-9914	An Georoidin	28/06/2017	v	Clare Owen	14:46	15:07	54	16.99	n	9	50.10	w	7.0	54	17.92	n	9	51.40	w	18.8	0																	

Effort Form – Subsea Viking

Regulatory reference number	Ship/ platform name	Date	Visual watch or PAM?	Observer's / operator's name(s)	Time of start of watch (UTC)	Time of end of watch (UTC)	Start position - degrees latitude	Start position - minutes latitude	Start position - north/ south	Start position - degrees longitude	Start position - minutes longitude	Start position - east/ west	Depth of water at start position (metres)	End position - degrees latitude	End position - minutes latitude	End position - north/ south	End position - degrees longitude	End position - minutes longitude	End position - east/ west	Depth of water at end position (metres)	Speed of vessel (knots)	Source activity	Wind direction	Wind force (Beaufort)	Sea state	Swell	Visibility (visual watch only)	Sunglare (visual watch only)	Comments	Flag record
ET0997	Subsea Viking	24/06/2017	v	Myrto Tougeili Provata	14:30	14:30	57	39.35	n	1	9.12	w	85.0	57	39.95	n	1	9.12	w	85.0	8.6	n	se	0	m	g	s		The transect to Corrib started at 14:30	
ET0997	Subsea Viking	24/06/2017	v	Myrto Tougeili Provata	16:18	17:18	57	42.05	n	0	41.75	w	107.0	57	45.18	n	0	41.75	w	106.0	8.5	n	sw	0	m	g	s			
ET0997	Subsea Viking	24/06/2017	v	Myrto Tougeili Provata	17:18	18:50	57	45.18	n	0	26.41	w	106.0	57	49.13	n	0	3.03	w	113.0	9.5	n	sw	5	m	g	s			
ET0997	Subsea Viking	24/06/2017	v	Myrto Tougeili Provata	18:50	19:20	57	49.13	n	0	3.03	w	102.0	57	51.07	n	0	4.76	w	113.0	9.3	n	sw	4	m	g	s			
ET0997	Subsea Viking	24/06/2017	v	Myrto Tougeili Provata	19:20	20:20	57	51.07	n	0	4.76	w	113.0	57	53.73	n	0	6.38	w	93.7	9.2	n	sw	3	m	g	s			
ET0997	Subsea Viking	25/06/2017	v	Myrto Tougeili Provata	06:45	06:45	58	29.67	n	2	34.34	w	61.5	58	29.67	n	2	34.34	w	61.5	9.0	n	s	6	m	g	n		Observation stopped bad weather	
ET0997	Subsea Viking	25/06/2017	v	Myrto Tougeili Provata	08:30	08:30	58	38.07	n	2	55.14	w	67.7	58	40.20	n	2	58.94	w	75.1	2.8	n	s	6	m	g	n		End of observation. Meeting bad weather	
ET0997	Subsea Viking	25/06/2017	v	Myrto Tougeili Provata	11:15	13:55	58	43.57	n	3	8.47	w	72.7	58	42.64	n	3	8.47	w	82.5	10.4	n	sw	5	m	g	n			
ET0997	Subsea Viking	25/06/2017	v	Myrto Tougeili Provata	13:55	14:30	58	42.64	n	3	57.47	w	82.5	58	42.49	n	4	8.81	w	93.8	10.7	n	sw	5	m	m	n		Stop due to rain and reduced visibility	
ET0997	Subsea Viking	25/06/2017	v	Myrto Tougeili Provata	16:30	18:20	58	40.65	n	4	51.29	w	59.2	58	31.69	n	5	19.37	w	58.1	11.0	n	sw	4	m	g	s			
ET0997	Subsea Viking	25/06/2017	v	Myrto Tougeili Provata	18:20	19:30	58	31.69	n	5	19.37	w	103.0	58	22.51	n	5	35.32	w	103.0	11.0	n	sw	4	m	g	s			
ET0997	Subsea Viking	25/06/2017	v	Myrto Tougeili Provata	20:30	21:30	58	11.48	n	5	55.40	w	100.0	58	8.74	n	5	59.77	w	98.2	11.0	n	sw	3	m	g	n			
ET0997	Subsea Viking	26/06/2017	v	Myrto Tougeili Provata	06:20	06:20	56	36.52	n	7	38.25	w	192.0	56	22.98	n	7	58.96	w	173.0	11.0	n	sw	3	m	g	n			
ET0997	Subsea Viking	26/06/2017	v	Myrto Tougeili Provata	08:20	10:34	56	22.08	n	7	58.66	w	173.0	56	2.80	n	8	25.76	w	139.0	11.5	n	sw	2	m	g	n			
ET0997	Subsea Viking	26/06/2017	v	Myrto Tougeili Provata	11:20	12:20	55	55.75	n	8	35.37	w	121.0	55	46.56	n	8	47.54	w	110.0	11.4	n	se	2	m	g	n		Entered waters of Ireland at 10:19UTC	
ET0997	Subsea Viking	26/06/2017	v	Myrto Tougeili Provata	12:20	13:25	55	46.56	n	8	47.54	w	110.0	55	38.89	n	9	0.34	w	90.3	11.3	n	se	2	m	g	n			
ET0997	Subsea Viking	26/06/2017	v	Myrto Tougeili Provata	13:25	14:45	55	36.89	n	9	0.34	w	90.3	55	25.56	n	9	15.18	w	123.0	10.9	n	se	2	m	g	n			
ET0997	Subsea Viking	26/06/2017	v	Myrto Tougeili Provata	14:45	15:45	55	25.56	n	9	15.18	w	123.0	55	16.64	n	9	27.10	w	105.0	11.0	n	se	2	m	g	n		break at 3:45 UTC	
ET0997	Subsea Viking	26/06/2017	v	Myrto Tougeili Provata	16:30	17:15	55	12.31	n	9	22.15	w	124.0	55	4.21	n	9	43.71	w	118.0	10.9	n	se	2	m	g	n		fog in the horizon	
ET0997	Subsea Viking	26/06/2017	v	Myrto Tougeili Provata	17:15	18:58	55	4.21	n	9	43.71	w	118.0	54	57.46	n	9	52.51	w	116.0	10.5	n	sw	3	m	g	n		Bad visibility due to fog	
ET0997	Subsea Viking	27/06/2017	v	Myrto Tougeili Provata	05:10	05:10	54	20.53	n	10	26.22	w	133.0	54	20.53	n	10	26.22	w	133.0	10.4	n	sw	3	m	g	n		Starting the prewatch at 7:33 UTC	
ET0997	Subsea Viking	27/06/2017	v	Myrto Tougeili Provata	06:30	07:33	54	20.10	n	10	2.43	w	76.4	54	17.05	n	9	52.33	w	45.0	0.3	n	sw	3	m	g	n		Starting the prewatch at 7:33 UTC	
ET0997	Subsea Viking	27/06/2017	v	Myrto Tougeili Provata	07:33	09:50	54	17.05	n	9	52.33	w	45.0	54	17.04	n	9	52.98	w	22.6	0.3	n	sw	3	m	g	n		ramp-up started at 8:14 finished at 8:52 UTC	
ET0997	Subsea Viking	27/06/2017	v	Myrto Tougeili Provata	09:50	11:10	54	17.04	n	9	52.98	w	22.6	57	17.43	n	9	54.02	w	28.0	0.7	n	sw	2	m	g	w			
ET0997	Subsea Viking	27/06/2017	v	Myrto Tougeili Provata	11:30	12:58	54	17.43	n	9	54.02	w	28.0	54	17.53	n	9	54.71	w	38.0	0.7	n	sw	2	m	g	n			
ET0997	Subsea Viking	27/06/2017	v	Myrto Tougeili Provata	12:35	13:25	54	18.05	n	9	55.51	w	38.0	54	18.37	n	9	56.26	w	38.9	0.6	n	sw	3	m	g	n		stopped for CTD samples, multibeam is on fuilpo	
ET0997	Subsea Viking	27/06/2017	v	Myrto Tougeili Provata	13:25	14:20	54	18.37	n	9	56.26	w	38.9	54	18.60	n	9	56.80	w	38.3	0.0	n	se	3	m	g	n		fog and rain reduce visibility	
ET0997	Subsea Viking	27/06/2017	v	Myrto Tougeili Provata	14:20	15:20	54	18.60	n	9	56.80	w	38.3	54	18.76	n	9	57.21	w	38.6	0.5	n	se	3	m	g	n			
ET0997	Subsea Viking	27/06/2017	v	Myrto Tougeili Provata	15:20	16:15	54	18.76	n	9	57.21	w	38.6	54	19.06	n	9	57.81	w	40.3	0.5	n	sw	2	m	g	n		break	
ET0997	Subsea Viking	28/06/2017	v	Myrto Tougeili Provata	08:00	09:00	54	20.42	n	10	10.86	w	100.0	54	20.24	n	10	8.21	w	92.3	11.0	n	sw	2	m	g	n			
ET0997	Subsea Viking	28/06/2017	v	Myrto Tougeili Provata	09:00	09:57	54	20.42	n	10	10.86	w	100.0	54	17.23	n	10	53.57	w	26.4	8.1	n	sw	2	m	g	n		prewatch started at 9:55	
ET0997	Subsea Viking	28/06/2017	v	Myrto Tougeili Provata	09:55	11:25	54	17.23	n	9	53.57	w	26.4	54	17.07	n	9	51.84	w	18.0	0.5	n	se	2	m	g	n			
ET0997	Subsea Viking	28/06/2017	v	Myrto Tougeili Provata	11:48	12:55	54	17.07	n	9	51.85	w	18.7	54	17.04	n	9	52.83	w	19.6	0.5	n	se	2	m	g	n			
ET0997	Subsea Viking	28/06/2017	v	Myrto Tougeili Provata	12:55	13:10	54	17.04	n	9	52.83	w	19.6	54	17.06	n	9	53.00	w	20.7	0.0	n	se	3	m	g	n		prewatch started at 13:10	
ET0997	Subsea Viking	28/06/2017	v	Myrto Tougeili Provata	13:10	15:12	54	17.06	n	9	53.00	w	20.7	54	17.01	n	9	52.24	w	19.3	0.6	n	se	3	m	g	n		soft start started at 13:52 full power at 14:23	
ET0997	Subsea Viking	28/06/2017	v	Myrto Tougeili Provata	16:38	17:35	54	17.26	n	9	53.58	w	24.3	54	17.56	n	9	54.29	w	31.7	0.7	n	sw	4	m	g	w		Start again after break at 15:12. End observation	
ET0997	Subsea Viking	29/06/2017	v	Myrto Tougeili Provata	03:51	05:00	54	20.43	n	10	11.06	w	98.4	54	20.43	n	10	11.06	w	99.2	0.3	n	sw	6	m	g	n		prewatch started at 3:51 UTC	
ET0997	Subsea Viking	29/06/2017	v	Myrto Tougeili Provata	05:00	06:20	54	20.43	n	10	11.06	w	98.4	54	20.44	n	10	12.32	w	98.0	0.7	n	sw	6	m	g	n			
ET0997	Subsea Viking	29/06/2017	v	Myrto Tougeili Provata	06:20	07:00	54	20.44	n	10	12.32	w	98.0	54	20.44	n	10	13.01	w	99.2	0.5	n	s	7	m	g	n		End of observation due to bad weather condition	
ET0997	Subsea Viking	29/06/2017	v	Myrto Tougeili Provata	16:45	17:10	54	20.49	n	10	18.70	w	114.0	54	20.50	n	10	19.11	w	116.0	0.3	n	s	7	m	g	n			
ET0997	Subsea Viking	29/06/2017	v	Myrto Tougeili Provata	17:10	18:50	54	20.50	n	10	19.11	w	116.0	54	20.50	n	10	19.73	w	118.0	0.4	n	s	7	m	g	n			
ET0997	Subsea Viking	30/06/2017	v	Myrto Tougeili Provata	06:20	07:55	54	20.53	n	10	22.35	w	127.0	54	20.54	n	10	22.91	w	126.0	0.4	n	s	7	m	g	n		Stop the watch due to bad weather	
ET0997	Subsea Viking	30/06/2017	v	Myrto Tougeili Provata	08:20	09:30	54	20.57	n	10	23.07	w	127.0	54	20.59	n	10	24.29	w	129.0	0.4	n	s	6	m	g	n			
ET0997	Subsea Viking	30/06/2017	v	Myrto Tougeili Provata	09:30	11:00	54	20.59	n	10	24.28	w	129.0	54	20.60	n	10	25.26	w	131.0										

Operations Form – Au Gearoidin

Ship/ platform name	Date	Reason for firing	Time soft start/ ramp-up began (UTC)	Time of full power (UTC)	Time of start of line (UTC)	Time of end of line (UTC)	Time of reduced output (UTC) (if relevant)	Time airguns/ source stopped (UTC)	Time pre-shooting search began (UTC)	Time search ended (UTC)	Time PAM began (UTC)	Time PAM ended (UTC)	Was it day or night in the period prior to firing?	Was any mitigating action required?	Comments	Flag record
An Gearoidin	23/06/2017	t	11:53	12:13				13:22	10:15	11:53			d	y	Delay in firing due to marine mammals	
An Gearoidin	23/06/2017	t	12:51	12:51				13:04	10:15	11:53			d	n		
An Gearoidin	26/07/2016	t	9:33	9:55				11:45	9:03	11:45			d	n		
An Gearoidin	26/07/2016	t	13:00	13:20				16:54	12:30	16:54			d	n		
An Gearoidin	27/06/2017	t	9:40	10:00				15:26	9:10	15:26			d	n		
An Gearoidin	28/06/2017	t	8:53	9:13				10:02	7:49	10:02			d	y	Delay in firing due to marine mammals	
An Gearoidin	28/06/2017	l	11:16	11:36	11:44	16:35		16:35	10:02	16:35			d	y	Delay in firing due to marine mammals	
An Gearoidin	29/06/2017	t	11:30	11:53				11:53	10:48	11:53			d	n	Test of pinger equipment	
An Gearoidin	01/07/2017	l	9:21	9:41				9:59	8:49	9:21			d	n	Pinger survey aborted due to adverse weather	
An Gearoidin	03/07/2017	l	8:51	9:11	9:17	9:31			8:20	14:21			d	n	Line aborted due to swell and vessel relocated	
An Gearoidin	03/07/2017	l			9:49	14:21		14:21					d	n	Watch continued throughout operations	

Operations Form – Subsea Viking

Regulatory reference number	Ship/ platform name	Date	Reason for firing	Time soft start/ ramp-up began (UTC)	Time of full power (UTC)	Time of start of line (UTC)	Time of end of line (UTC)	Time of reduced output (UTC) (if relevant)	Time airguns/ source stopped (UTC)	Time pre-shooting search began (UTC)	Time search ended (UTC)	Time PAM began (UTC)	Time PAM ended (UTC)	Was it day or night in the period prior to firing?	Was any mitigating action required?	Comments	Flag record
ET0997	Subsea Viking	27/06/2017				00:08	00:08	04:03						n	n	Operation performed offshore at	
ET0997	Subsea Viking	27/06/2017		08:14	08:52	08:52				07:33	08:14			d	n		
ET0997	Subsea Viking	28/06/2017					08:26		08:26					d	n		
ET0997	Subsea Viking	28/06/2017		11:16	11:46	11:46				09:55	11:16			d	n		
ET0997	Subsea Viking	28/06/2017		13:52	14:23	14:23			13:08	13:10	13:52			d	n		
ET0997	Subsea Viking	29/06/2017		04:40	05:06	05:06	01:35		01:35	03:51	04:40			d	n		
ET0997	Subsea Viking	01/07/2017		06:31	07:07	07:07	05:05		05:05					d	n	More than 200m. Requested soft-start	
ET0997	Subsea Viking	02/07/2017			21:54	21:54	21:14		21:14					d	n	More than 200m.	
ET0997	Subsea Viking	03/07/2017			00:28	00:28	23:46		23:46					d	n	More than 200m. Small break in line	