Cruise report for JR109 (AFI 2/34)

AIM

The aim of cruise JR109 was to collect 100 *Laternula elliptica*, 100 *Nacella concinna* and 10 *Harpagifer sp.* from Signy and South Georgia for a latitudinal comparison with Rothera populations. South Georgia and Signy animals were then transported to Rothera where experiments on thermal evolution/adaptation were conducted.

SUMMARY

During the diving cruise JR109 at Signy and South Georgia three different benthic species where collected during 16 SCUBA dives. All three Signy species were successfully collected within 2 days in Borge Bay, which allowed time for an extra half days benthic sampling and surveying to be conducted for Dave Barnes (MOA) and Cath Waller (MOA PhD).

At South Georgia none of the clam, *Laternula elliptica*, could be found, despite diving a wide range of suitable looking bays along the North coast of South Georgia (King Edward Cove, Elsehul & Rosita Habour), limpets, *Nacella concinna*, and fish, *Harpagifer georgianus*, were collect within 2 dives at King Edward Point.

Due to the persistence of winter ice around Adelaide Island J.C.R. was unable to reach Rothera at the first attempt. Due to the requirements to use of the cold specimen room for biosciences cruise JR116 the animals were moved into the transport aquarium container and maintained onboard until the second attempt to get to Rothera on 23 January.

PERSONNEL

Simon Morley (PSO) Matt Brown (Field Diving Officer) Keiron Fraser (Scientific Diver/Assistant Diving Officer) Dave Barnes (Scientific Diver) Katrin Linse (Scientific Diver) Peter Enderlein (Scientific Diver)

EQUIPMENT FOR DIVING

Dive planning was thorough and more than enough equipment was provided by John Withers (F.D.O. Rothera). There were few problems with equipment used during diving operations. As indicated below the surface marker buoys used routinely at Rothera proved to be ineffective on this cruise. A more substantial buoy was borrowed from the ship which was very effective for open water use.

The recompression chamber functioned effectively in its container.



Figure 1. The containerised recompression chamber.

The only negative issues arose from poor servicing of equipment by external contractors.

- The spare air bank was unusable due to contamination.
- Incorrectly wired chamber (had to be rewired by ships electrician)

A list of improvements to the recompression chamber setup will be submitted by the F.D.O. Matt Brown

A further servicing problem occurred with the chainsaw.

- The chainsaw had a broken engine mount which was not replaced during its service, rendering it unusable.

SHIP SUPPORT

The officers and crew of the James Clark Ross could not have done more to accommodate the divers and make the collections a success. James Clark Ross is the ideal platform for a diving operation such as this. The chamber was situated on the aft deck giving easy access to the wet laboratory where divers prepared for diving.

The only negative comment must be reserved for the ships Combat Support Boat, which was initially used as a dive platform. On such a high specification vessel as the JCR the

CSB stands out as inadequate, it is highly unreliable and required unacceptable levels of repair/maintenance whenever it was put in the water.

MARINE AQUARIUM

Using a similar setup to the transport aquarium worked well in the specimen cold room.



Figure 2. Marine aquarium setup in the Cold Specimen Room

Lucy Conway's expertise, and that of the JCR deck engineers, ensured that temperatures could be maintained between 0 and 1°C (set point -3°C). Water exchange had to be performed manually due to restrictions on the amount of water that could be put down the sink or toilet (waste water had to be treated due to transportation of species into and out of 60°S).

When the requirements for the cold specimen room changed it was a simple procedure to transfer the animals into the transport aquarium container. During cargo operations the container was temporarily housed in a warehouse on FIPAS. Once underway, the container was housed in number 2 hold and although it was not possible to plug the container alarms into the JCR alarm system, temperatures were checked regularly by officers doing rounds. Water was tapped from the forward outlet of the uncontaminated seawater supply and piped through the emergency escape hatch into the hold. Waste water was stored in dustbins, treated for 24 hours with sodium hypochlorite and then pumped overboard using an airlift pump.

Diary of diving operations (see Appendix 1 for dive logs). (see Appendix 2 for species list).

Borge Bay Signy

Day 1: 28 October

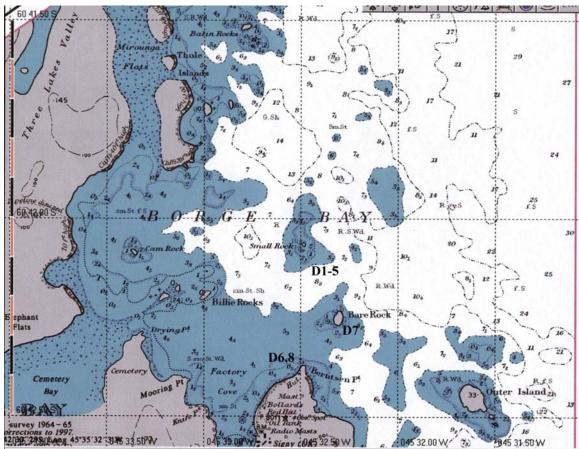


Figure 3. Chart of Borge Bay showing dive sites for dives 1-8 (D1-8).

Diving was initially delayed due to problems with the main crane and then the CSB boat. Diving was then abandoned for the day at 14:30 due to a leopard seal being sighted in Factory Cove.

Evening discussions sought a more pragmatic response to leopard seal sightings. Leopard seals are a constant presence at Signy (due to the abundance of food) unlike Rothera where they are vagrants. It was proposed that after sighting a leopard seal a two hour period would be allowed before a recommencement of a 30 minute seal watch prior to diving. Approval was gained from the diving contractor, John Dudney, the institute diving officer, John Hall, and the field diving officer, Matt Brown.

Specimen Count: 100 *Nacella concinna* were collected by Katrin and Cath Waller from the shore.

Day 2: 29 October

Dive 1: Small Rocks - Keiron (Simon) 60 42.16 S, 45 35.45 W The CSB was not an ideal diving platform, due to its shape, but reasonable entry was possible. Whilst leaving the CSB the divers surface marker buoy line got tangled and the inadequate float was dragged under the surface. This meant that diver recall was not possible when 2 leopard seals arrived on site. When divers surfaced they were hauled into the CSB, but with difficulty as the ladder was not functional. The larger leopard seal was showing aggressive signs towards the CSB, the smaller leopard seal was showing passive interest in the divers and was observed within 1m of the divers whilst underwater.

Specimen count: 13 *Laternula elliptica*

Diving was postponed for 2 hours before a further 30 minute seal watch was conducted.

Dive 2: Small Rocks - Dave (Matt) 60 42.16 S, 45 35.45 W

Specimen count: 18 *Laternula elliptica*

Dive 3: Small Rocks - Katrin (Peter) 60 42.16 S, 45 35.45 W

Specimen Count: 20 *Laternula elliptica*

Day 3: 30 October

After more technical difficulties with the CSB and its relative unsuitability as a diving platform, diving was transferred to the inflatables.

Dive 4: Small Rocks - Keiron (Simon) 60 42.16 S, 45 35.45 W

Specimen Count: 34 *Laternula elliptica*

Dive 5: Small Rocks - Dave (Matt) 60 42.16 S, 45 35.45 W

Divers were recalled to the surface after a leopard seal was spotted. Getting divers back into inflatables was a much more rapid process than into the CSB. *Laternula elliptica* collection was complete.

Specimen Count: 35 *Laternula elliptica* - Total = 120

Dive 6: Bernstein Point - Katrin (Peter) 60 42.36 S, 45 35.52 W

Specimen Count: 9 *Harpagifer antarcticus*

Day 4: 31 October

As the I.T. work at Signy base was not finished JCR made resources available for extra diving. Divers entered the water from the cargo tender (with the ramp level) and were picked up by an inflatable which worked extremely well.

Dive 7: Bare Rock - Dave (Simon) 60 42.25 S, 45 32.31 W

Species lists were compiled from quadrats (for Cath Waller). Rock samples were collected for a decadal assessment of competitive interactions between clades (for Dave Barnes).

Dive 8: Bernstein Point - Peter (Matt) 60 42.36 S, 45 35.52 W

Species lists were compiled from quadrats.

South Georgia

Day 1: 6 November 2004

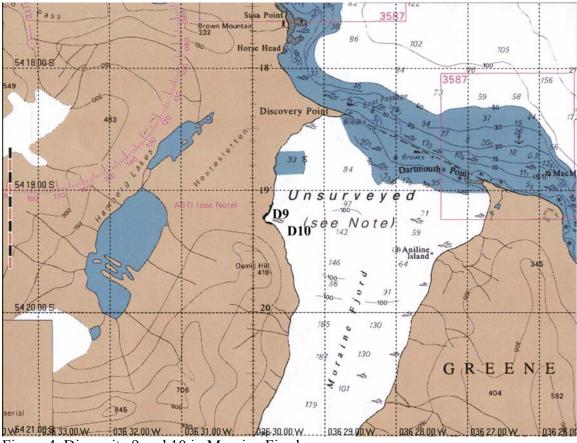


Figure 4. Dives site 9 and 10 in Moraine Fjord.

Dive 9: Moraine Fjord, where Osmic Hill joins Zenca ridge – Keiron (Simon) 54 19.21 S, 36 29.77 W

There was a possible sighting of *Laternula elliptica*, and a definite shell was found. The substratum was too soft and anoxic to be suitable for large beds of *Laternula elliptica*. Visibility was good at the surface (4m+), very poor in mid depths (<1m) then cleared below 15m (2m).

Dive 10: Moraine Fjord, off Osmic Hill - Dave (Matt) 54 19.21 S, 36 29.77 W

Once again the sediment was too soft for Laternula elliptica

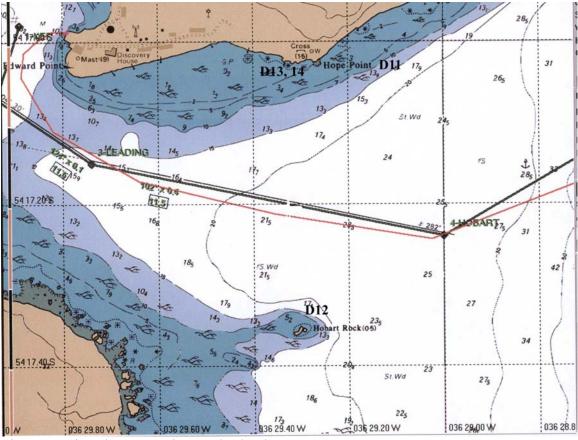


Figure 5. Dive sites 11-14 in Cumberland East Bay.

Dive 11: Off Hope Point 54 17.05 S, 36 29.21 W

Weed covered bottom, cobbly with little mud. No Laternula elliptica

Day 2: 7 November 2004

The Grytviken jetty was investigated but was deemed unsafe to dive.

Dive 12: Hobart Rocks - Dave (Matt) 54 17.36 S, 36 29.30 W

A weed covered bottom unsuitable for Laternula elliptica

Dive 13: Inside Hope Point - Keiron (Simon) 54 17.03 S, 36 29.48 W

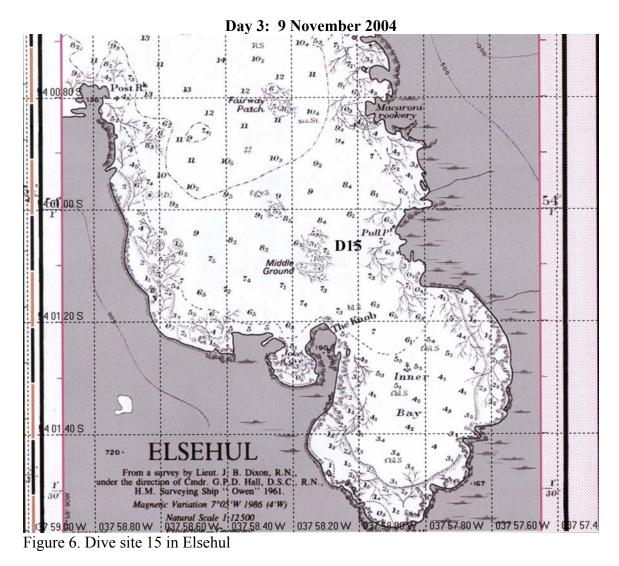
Shallow water dive was terminated early due to inquisitive male elephant seal.

Specimen count 100+ Nacella concinna, 1 Harpagifer georgianus

Dive 14: Inside Hope Point - Katrin (Peter) 54 17.03 S, 36 29.48 W

Dive was interrupted but not terminated due to inquisitive male elephant seal.

Specimen Count 10 Harpagifer georgianus



Dive 15: Elsehul - Dave (Simon) Elsehul 54 01.11 S, 37 58.02 W Dive terminated early as the bay was covered in a coarse sandy substrate. Elsehul is too exposed for *Laternula elliptica*

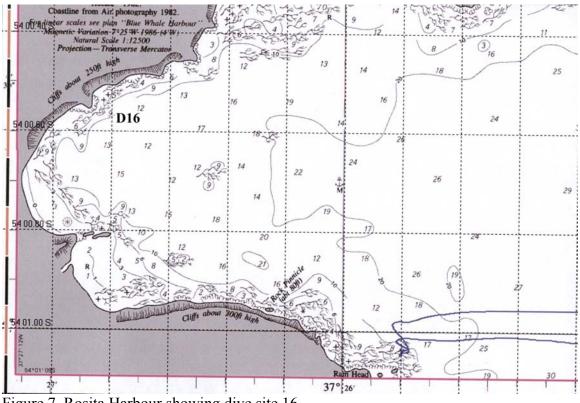


Figure 7. Rosita Harbour showing dive site 16

Dive 16: Rosita Harbour - Keiron (Peter) 54 00.58 S, 37 26.74 W

Suitable looking mud but no sign of any Laternula elliptica

Day 4: 10 November 2004

The wind was too strong to dive in Prince Olav Harbour so JCR headed for Stanley.

Appendix 1 – Dive logs.

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| I appoint: | M. BROWN | | | | as diving | supervisor | for this task. |
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| Signed: | Moron | ~~ | | | (Field Dive C | officer, on behalf o | of John Dudeney) |
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| DCIEM Schedu Diver 1 D. Lances Multi Level Div | lle: Diver 2 5. Morter e: | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. & Aawes Multi Level Div Marine Mamm | al Encounter: Y | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. Lances Multi Level Div | al Encounter: Y | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. & Aawes Multi Level Div Marine Mamm | al Encounter: Y | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. & Aawes Multi Level Div Marine Mamm | al Encounter: Y | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. & Aawes Multi Level Div Marine Mamm | le: Diver 2 5. Morter e: al Encounter: Y Actions Taken: | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. Laaves Multi Level Div Marine Mamm Emergencies & | le: Diver 2 5. Morter e: al Encounter: Y Actions Taken: | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. Laaves Multi Level Div Marine Mamm Emergencies & | le: Diver 2 5. Morter e: al Encounter: Y Actions Taken: | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |

Supervisor Signature:

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| | RC | | | CTIC SURVE STATION DI | | | |
|---|--|-------------|--|--------------------------|------------------|---------------------------|------------------|
| Dive Contracto | | | | | | | ····· |
| | officer: John Hal | | | | | ive Officer: | Matt Brown |
| Date: 3110/0 | | | Site: BEA | R Rock, Bo | RGE BAY , | SIGNY | |
| Task: SURVET | | RARH | | · · · · · · | | | |
| JRIO | | | | | | | Boat Ice |
| - | Emergenc | y Support | Arrangemen | ts Co-ordinat | | | |
| I appoint: | M. BROWN | | | | as diving | supervisor | for this task. |
| | | | | | | | |
| | × Pl | | | | | | |
| Signed: | Moron | ~~ | | | (Field Dive C | officer, on behalf o | of John Dudeney) |
| Non-divers in o | | K. FRASE | < | | | | |
| | - | P. ENDERC | | | | | |
| <u></u> | | K. UNSE | - | | | | |
| Weather/Sea St | ate: 🖌 | | | Pre-dive ar | ea observati | | |
| D' | $\frac{r_i}{r_i}$ | | C Distance Del | tor Dathana I | TEL S | (HR + SO and valaviant | min On Site |
| assessment to | ad and understa | ind the BA | S Diving Pol | | | | |
| Specific Pre-dive Risk | | | | FD | O sign: | Goor | |
| optime r re-orre russ | | | | | B | | |
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| | | | | | | | |
| | ent: (Circle) Lov | | An | | (16).:- | h 15.4 | table abarra) |
| Final Assessment | ent: (Circle) Loy | wer/Morma | NAHIOHAT | | (1f nig | her, list con | trois adove) |
| | | | and the second s | | B | | |
| DCIEM Schedu | | 9 | yringher. | | | Safety Sto | |
| | | L/S | Depth | B/T | A/S | | |
| DCIEM Schedu | le: | | | B/T 41 | | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 | Diver 2 S. MOREN | L/S | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. KARNES | Diver 2 S. MOREN | L/S | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. KARNES | Diver 2 S. MOREN | L/S | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. KARNES | Diver 2 S. MOREN | L/S | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. KARNES | Diver 2 S. MOREN | L/S | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. KARNES | Diver 2 S. MOREN | L/S | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. KARNES | Diver 2 S. MOREN | L/S | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. KARNES | lle: Diver 2 5. Morter e: | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. Lances Multi Level Div | lle: Diver 2 5. Morter e: | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. Lances Multi Level Div | lle: Diver 2 5. Morter e: | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. & Aawes Multi Level Div Marine Mamm | al Encounter: Y | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. Lances Multi Level Div | al Encounter: Y | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. & Aawes Multi Level Div Marine Mamm | al Encounter: Y | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. & Aawes Multi Level Div Marine Mamm | al Encounter: Y | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. & Aawes Multi Level Div Marine Mamm | le: Diver 2 5. Morter e: al Encounter: Y Actions Taken: | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. Laaves Multi Level Div Marine Mamm Emergencies & | le: Diver 2 5. Morter e: al Encounter: Y Actions Taken: | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |
| DCIEM Schedu Diver 1 D. Laaves Multi Level Div Marine Mamm Emergencies & | le: Diver 2 5. Morter e: al Encounter: Y Actions Taken: | L/S 0746 | Depth | | A/S | Safety Sto | p: <u>3@6</u> |

Supervisor Signature:

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| | or: John Dudeney Officer: John Hall | | | | Field D | ive Officer | r: Matt |
|------------------------------|---|------------|------------|-------------|-------------------|--|-------------|
| Date: 31/10/0 | | | Site: 7 | ernsrein | POINT, BORG | E GAT , | Sign |
| | - 109 Af. | RAPHY . | | | Nature of I | Dive: Shor | re 🕭 |
| | | | Arrangen | ents Co-oro | linated by: JCR | Ops superviso | n fan th |
| appoint: | Kalon | fraser | | | as diving | superviso | r 101 r |
| | | | | | | | |
| Signad. | M | mon | • | | (Field Dive | officer, on beha | lf of Johr |
| Signed: Non-divers in (| | | LINSE | CARGO 7 | | | |
| | | | GARNES | | | | |
| | | <u>s.</u> | mores | - an- | | on complet | tode |
| Weather/Sea S | state: $f_{.}$ | | | Pre-di | ve area observati | on complete $f \leq 24$ | tea: 4 - |
| Divers have r | ead and understa | and the BA | S Diving I | olicy, Roth | era Dive manual | and releva | nt risl |
| assessment to | | | 5 | - | FDO sign: | VPA | mur |
| Specific Pre-dive Ri | sk Assessment: | | | | FDO sign: | ··· / ·· ·· / ·· ·· ·· ·· ·· ·· ·· ·· ·· | |
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| | | | | | | | |
| Etwal Association | aanta (Cirala) I | Vallar | Higher | | (If bi | gher, list co | ontrole |
| Final Assessn DCIEM Sched | nent: (Circle) Lo [.] Iule: | weighorm | rigner | <u></u> | (11 111 | Safety S | |
| | | | | | | | |
| Diver 1 | Diver 2 | L/S | Depth | B/T | A/S | D/T | Di |
| M. BROWN | P. ENDERLEM | 1114 | 9_ | 25 | 11 39 | 25 | |
| Multi Level Di | ive: | | - | | | | |
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| | 1 | | | | | | |
| Marina Marr | nal Encounter: V | les No | | | | | |
| Marine Mamr | nal Encounter: Y | (es No | | | | | |
| Marine Mamı | nal Encounter: Y | (es No | | | | | |
| | | <u> </u> | | | | | |
| | nal Encounter: Y & Actions Taken | <u> </u> | | | | | <u></u> |
| | | <u> </u> | | | | | |
| Emergencies & | & Actions Taken | : Yes(No) | | | | | |
| Emergencies & | | : Yes(No) | | | | | |
| Emergencies & | & Actions Taken | : Yes(No) | | | | | |
| Emergencies & | & Actions Taken | : Yes(No) | | | | | |

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| | RC | | | CTIC SURVE STATION DI | | | |
|---------------------------|--------------------|--------------------|----------------------|--------------------------|--------------|----------------------|------------------|
| Dive Contracto | r: John Dudeney | , Deputy D | irector, Britis | h Antarctic Su | rvey. | | |
| Institute Dive C | Officer: John Hal |] | | | Field 1 | Dive Officer: | Matt Brown |
| Date: SAT 6 | | | Site: Osu | we Hill, M | ORAINE FSO | S.F. S.F. | |
| Task: Conec A | | NUCA | | | Nature of | Dive: Shore | - Coat - Ice |
| 418 | | | Arrangeme | nts Co-ordinat | ted by: JCR | Ops | |
| I appoint: | MATT BROM | μ L | | | as divin | g supervisor | for this task. |
| Signed: | 3 | hears | | ••••••••••••••• | (Field Dive | Officer, on behalf o | of John Dudeney) |
| Non-divers in o | peration: | | ES - <u>Bon</u> t | | | | |
| | | K. LINSE P GUDE | - BOAT REEINS - B | canif of | | | |
| Weather/Sea St | ate: C | I. ENUE | | Pre-dive a | rea observat | ion complete | d: |
| | F, | | | | | YES | 30 Arin ON Site |
| Divers have re | ad and underst | and the B A | AS Diving Po | licy, Rothera I | Dive manua | l and relevan | t risk |
| assessment to | | | | ED | O signe | | لحتمان |
| Specific Pre-dive Rish | Assessment: | | | FD | o sign: | ···· /··· /···· | 515 |
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| · · · · · · · · · · · · · | ent: (Circle) Lo | wer/Korm | aDHigher | | (lf bi | gher, list con | |
| DCIEM Schedu | ile: 18m | | | | | Safety Sto | · |
| Diver 1 | Diver 2 | L/S | Depth | B/T | A/S | D/T | Dive No. |
| K. FRANER | S. MORCET | 1032 | 17.5 | 27 | 1102 | 30 | |
| Multi Level Div | /e: | | | | | | |
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| Marine Mamm | al Encounter: Y | esNo | | | | | |
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| | | | | | | | |
| Emergencies & | Actions Taken: | Yes/No:) | | | | | |
| | | <u> </u> | | | | | |
| | | | | | | | |
| Diana Paraka | Tuinuist- 1 | | | | | | |
| Diver Problems | s, injuries etc: Y | enno | | | | | |
| | | | | | | | |
| | | | | | | | |

Supervisor Signature:

| Institute Dive | or: John Dudeney Officer: John Hal | , Deputy D | irector, Britis | in Antarctic Sur | Field D | Dive Officer | Matt Brown |
|---------------------------------------|--|--------------------|-----------------|------------------|-------------|----------------------------|----------------------------------|
| Date: 6th | | | Site: 03- | mic Hill , | MORAINE | fold. | <u> </u> |
| Task: Conieca Ah. JR10 | rion (LATE | ennla | | | | | e Boat- Ice |
| | Emergenc | y Support | Arrangeme | nts Co-ordinat | ed by: JCR | Ops | for this task. |
| I appoint: | PL | SER . | | | | | |
| Signed: | ····· k··· k·· k·· (·· ···· | | | <u></u> | (Field Dive | Officer, on benan | BI JOHN Dudeney) |
| Non-divers in | operation: | P. ENDER 5. Mon | | | | | |
| | | K. UN | • | | | | |
| Weather/Sea S | state: | | | Prc-dive ar | ea observat | ion complet | ed: Yes |
| assessment to Specific Pre-dive Ri | | | | FD | O sign: | | |
| Final Assessr DCIEM Scheo | nent: (Circle) Lo Jule: Z ø ~ | wer/Norm | al/Higher | | (If hi | gher, list co Safety St | ntrols above) cop: <u>3@6</u> |
| Diver 1 | Diver 2 | L/S | Depth | B/T | A/S | D/T | Dive No. |
| M. BROWN | D. BARNES | 11 47 | 20- | 23 mm | 12.14 | 27 | |
| Multi Level D | | | | | L | | |
| | | | | | | | |
| | mal Encounter: Y & Actions Taken | <u> </u> | | | | | |
| Emergencies | | :: Yes/10: | | | | | |
| Emergencies of Diver Probler | & Actions Taken ns, Injuries etc: ` | :: Yes/10: | | | | | |
| Emergencies | & Actions Taken ns, Injuries etc: ` gnature: | :: Yes/10: | | | | | |

| | ector: John Dudeney ve Officer: John Hal | | rector, Briti | | Field D | vive Officer: | Matt Brown |
|-------------------------|--|-------------------|---------------|----------------|------------------|-------------------------------------|----------------------|
| Date: 06 | | | Site: | YOPE POINT | , 5.5. | | |
| Task: Ce | NIECTION CATER | NULA | | | | | |
| A/ | G JRIOM. | | | | | Dive: Shore | – F oat – Ice |
| | | | Arrangeme | ents Co-ordina | ted by: JCR | Ops supervisor f | East this task |
| I appoint: | M. Breash | I | | | as diving | supervisor | or this task. |
| Signed: | in operation: | K. KASE | 0 | ····· | •••••(Field Dive | Officer, on behalf o | f John Dudeney) |
| Tion urvers | in operation. | S. Mun | | 19 7 | | | |
| | | | | | | | <u> </u> |
| Weather/Se | a State: | | | Pre-dive a | rea observati | on complete | 1: 1 6. |
| assessment | e read and underst t to the task: e Risk Assessment: | | 0 | |)O sign: | Moron | |
| Final Asse DCIEM Sci | ssment: (Circle) Lo hedule: | werNorma | Higher | | (If hi | <u>gher, list con</u> Safety Sto | |
| D: 1 | 21 m | L/S | Donth | B/T | A/S | D/T | Dive No. |
| Diver 1 | Diver 2 | | Depth | | | | Direitor |
| K. LINSE | P. ENDERLEN | \$20 | 18 | 22 min | 1S 4S | 25 | |
| Marine Ma | mmal Encounter:- | | | | | | |
| Emergencie | es & Actions Taken | : FES/10 : | | | | | |
| Diver Probl | lems, Injuries etc: Y | | | | | | |
| | lems, Injuries etc: Y | | TOLIN. | | | | |

| Dive Contract | or: John Dudene | y, Deputy I | Director, Briti | sh Antarctic Su | | | |
|---|--|---------------------|-------------------|-----------------|---------------|------------------------------|--------------|
| | Officer: John Ha | | | 0 | | Dive Officer: | |
| $\frac{\text{Date: } \mathcal{F}_{[n]}}{\text{Task: } Const.}$ | | RNULA | Site: A | ALL ROOMS, | SCYTVILL | 5~ S. S | ÷. |
| TASK. COLLE | | | | | Noture of | Diver Chan | |
| 411 | | ev Sunnor | t Arrangeme | nts Co-ordina | Ind has ICD | Dive: Shore | (- D0a |
| I appoint: | K. FRASER | cy suppor | t Allangenie | nis Co-oruma | | g supervisor | for thi |
| •• | | | | | | B suber (1991 | |
| Signad. | RA | roun . | | | | | |
| Signed: Non-divers in o | | | •••••• | | (Field Dive | Officer, on behalf | of John D |
| Non-divers in o | peration: | C. LINSE ENPERLE | i al | | | | |
| | - | MOTEL | | | | | |
| Weather/Sea S | | | - | Pre-dive ar | ea observat | ion complete | d: |
| | r _i − | | | | | tes | |
| | ead and underst | and the B | AS Diving Po | licy, Rothera I | Dive manua | and relevan | t risk |
| assessment to | the task: | | | | | . 01 | |
| Specific Pre-dive Ris | k Assessment: | | | FD | O sign: | . f. Wyson | |
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| | | | - | | | | |
| Final Assessm | ent: (Circle) Lo | wer/Norm | Al/Higher | | (If hi | gher, list con | trols a |
| | | wer/Norm | 1/Higher | | (If hi | gher, list con Safety Sto | |
| | | wer/Norm | L/Higher Depth | B/T | (If hi A/S | | p: <u>3@</u> |
| DCIEM Sched | ule: | | - - | B/T 19 mm/m | | Safety Sto | |
| DCIEM Sched Diver 1 み. られのいへ | Diver 2 D. Baenes | L/S | Depth | | A/S | Safety Sto | p: <u>3@</u> |
| DCIEM Sched Diver 1 M. 610 NA | Diver 2 D. Baenes | L/S | Depth | | A/S | Safety Sto | p: <u>3@</u> |
| DCIEM Sched Diver 1 M. 610 NA | Diver 2 D. Baenes | L/S | Depth | | A/S | Safety Sto | p: <u>3@</u> |
| DCIEM Sched Diver 1 M. 610 NA | Diver 2 D. Baenes | L/S | Depth | | A/S | Safety Sto | p: <u>3@</u> |
| DCIEM Sched Diver 1 み. られのいへ | Diver 2 D. Baenes | L/S | Depth | | A/S | Safety Sto | p: <u>3@</u> |
| DCIEM Sched Diver 1 ハ. ちんのいへ | Diver 2 D. Baenes | L/S | Depth | | A/S | Safety Sto | p: <u>3@</u> |
| DCIEM Sched Diver 1 M. 610 NA | Diver 2 D. Baenes | L/S | Depth | | A/S | Safety Sto | p: <u>3@</u> |
| DCIEM Sched Diver 1 M. ໂແວນດ Multi Level Div | Diver 2 D. Ballnes ve: | L/S 0946 | Depth | | A/S | Safety Sto | p: <u>3@</u> |
| DCIEM Sched Diver 1 M. ໒ແວມາ Multi Level Div | Diver 2 D. Baenes | L/S 0946 | Depth | | A/S | Safety Sto | p: <u>3@</u> |
| DCIEM Sched Diver 1 M. ຍິແວ ພາດ Multi Level Div | Diver 2 D. Ballnes ve: | L/S 0946 | Depth | | A/S | Safety Sto | p: <u>3@</u> |
| DCIEM Sched Diver 1 M. ຍິແວ ພາດ Multi Level Div | Diver 2 D. Ballnes ve: | L/S 0946 | Depth | | A/S | Safety Sto | p: <u>3@</u> |
| DCIEM Sched Diver 1 M. రిజం ఎంసి Multi Level Div | ule: Diver 2 D. Balmes ve: al Encounter: Y | L/S 0 946 | Depth | | A/S | Safety Sto | p: <u>3@</u> |
| DCIEM Sched Diver 1 M. రిజం ఎంసి Multi Level Div | Diver 2 D. Ballnes ve: | L/S 0 946 | Depth | | A/S | Safety Sto | p: <u>3@</u> |
| DCIEM Sched Diver 1 M. రిజం ఎంసి Multi Level Div | ule: Diver 2 D. Balmes ve: al Encounter: Y | L/S 0 946 | Depth | | A/S | Safety Sto | p: <u>3@</u> |
| DCIEM Sched Diver 1 או נאס שאר Multi Level Div Marine Mamm | ule: Diver 2 D. Balmes ve: al Encounter: Y | L/S 0 946 | Depth | | A/S | Safety Sto | p: <u>3@</u> |
| DCIEM Sched Diver 1 ח. לאס היא Multi Level Div Marine Mamm Emergencies & | Diver 2 D, Balmes ve: al Encounter: Y Actions Taken: | L/S 0 946 | Depth | | A/S | Safety Sto | p: <u>3@</u> |
| DCIEM Sched Diver 1 ח. 6גם האל Multi Level Div Marine Mamm Emergencies & | ule: Diver 2 D. Balmes ve: al Encounter: Y | L/S 0 946 | Depth | | A/S | Safety Sto | p: <u>3@</u> |
| DCIEM Sched Diver 1 ח. 6גם האל Multi Level Div Marine Mamm Emergencies & | Diver 2 D, Balmes ve: al Encounter: Y Actions Taken: | L/S 0 946 | Depth | | A/S | Safety Sto | p: <u>3@</u> |

| | RC | BRITI DTHERA F | | | IC SURV ATION D | | | |
|--------------------------------------|--------------------------------------|---|-------------|------------|--------------------|-----------------|-----------------------|------------------|
| Dive Contracto Institute Dive (| r: John Dudeney Officer: John Hal | , Deputy D l | irector, Bi | ritish A | ntarctic Si | urvey. Field | Dive Officer | Matt Brown |
| Date: 7/]04 | | - | Site: / | Hole | POINT | KEP. | South 9. | |
| Task: Courc | | ETS. | | 1 | 10.001 | | | |
| Af sei | | | | | | Nature of | f Dive: Shor | e - (Boat) - Ice |
| | | y Support | Arrange | ments (| Co-ordina | nted by: JCI | R Ops | |
| I appoint: | M. BRO | | | | | | | for this task. |
| Signed: | ····/ | ~~~~~ | | | | (Field Div | e Officer, on behalf | of John Dudency) |
| Non-divers in o | peration: | D. BARNES | | | | | | |
| | | P. ENDERE | | | | | | |
| | | K. LINSE | | | x | 1 | 4************ | |
| Weather/Sea-St | | | | | | | ition complete VES | |
| | ad and understa | and the BA | S Diving | Policy, | | | | |
| assessment to | | | | | וקו | O alam | Moro | 274. |
| Specific Pre-dive Ris | k Assessment: | | | | F | DO sign: | <i>4</i> | |
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| | | | | | | | | |
| Final Assessm | ent: (Circle) Lov | wer/Norma | Higher | | | (If) | igher, list coi | trols above) |
| DCIEM Schedu | | der ter ter ter ter ter ter ter ter ter t | - inghei | | | (| Safety St | |
| 201201000000 | | | | | | | | <u> </u> |
| Diver 1 | Diver 2 | L/S | Depth | B / | | A/S | D/T | Dive No. |
| K. IRASER | S. MURLEY | 1038 | 2- | | 27 | 1105 | 27. | |
| Multi Level Div | /e: | | | | | | | |
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| Marine Mammal Encounter Ts/No | | | | | | | | |
| ELEPHONT SEAL | | | | | | | | |
| | | | | | | | | |
| Emergencies & Actions Taken: VegNo: | | | | | | | | |
| DIVERS REMOVED FROM WATER. | | | | | | | | |
| | | | | | | | | |
| Diver Problems, Injuries etc: Yes No | | | | | | | | |
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| | | | | | | | | |
| Supervisor Sign | nature: | | have | | | | | · |
| Supervisor Sign | nature: | | from. | | | | | |

| | RC | | ISH ANTAR RESEARCH | | | | |
|------------------------|--------------------------|-----------------------|---|--------------|------------------------------|---------------------------------------|---------------------------------|
| Dive Contracto | r: John Dudeney | , Deputy D | irector, Britis | h Antarctic | Survey. | | |
| | Officer: John Hal | 1 | ~ | | | Dive Officer | r: Matt Brown |
| Date: 7/10/04 | TIDA HARRE | | Site: 40h | F POINT - | KEP. | · · · · · · · · · · · · · · · · · · · | |
| | AUY. | · 3 | | | Noture of I | Direct Char | |
| | | v Sunnart | Arrangeme | te Co-ordi | Nature of I nated by: JCR | | re (Boat) Ice |
| I appoint: | M. Blown | <u>، oupport</u> د | Allangemen | 113 CO-01 UI | | | r for this task |
| Signed: | | Zona . | | | (Field Dive | Officer, on behal | f of John Dudeney) |
| Non-divers in o | peration: S. | MORLEY GARNES | - Болт с. <u>7</u> снати | ee. | | | |
| Weather/Sea St | tate: | c. FRASER | <u>, , , , , , , , , , , , , , , , , , , </u> | Pre-dive | area observati | on complet | ed: |
| Divers have re | ad and understa | nd the BA | S Diving Pol | icy. Rother | a Dive manual | and releva | 7 E s nt risk |
| assessment to | | | | - | | . 01 | |
| Specific Pre-dive Risk | «Assessment; | | | ł | DO sign: | f fre | 2 6 / 7 · |
| | | | | | | | |
| Final Assessme | onte (Cinalo) I or | | 1/TT: | | (161) | | |
| DCIEM Schedu | ent: (Circle) Lov de: | ver/norm2 | al/Higaer | | (If hig | Safety St | ntrols above) op: <u>3@6</u> |
| Diver 1 | Diver 2 | L/S | Depth | B/T | A/S | D/T | Dive No. |
| K. LINSE | P. ENDERLEIN | 1526 | 2. | 31 | 1557 | 31 | |
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| Multi Level Div | е. | | | | | | |
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| Marine Mamme | al Encounter: Ye | | | | | | |
| ina ne manna | a Bacounter. 10 | | | | | | |
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| | | | | | | | |
| Emergencies & . | Actions Taken: | Ver No | | | | | |
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| Diver Problems | Injuries etc: Ye | | | | | | |
| bitter i fobsetilis, | injuries etc. re | | | | | | |
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| Supervisor Signa | ature: | | MAro | 2.2. | | | |
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| Dive Contracto | r: John Dudeney Officer: John Hal | , Deputy Di | rector, Britis | h Antarctic Sur | vey. Field D | ive Officer: I | Matt Brown |
|---|--------------------------------------|-------------|----------------|-----------------|------------------------|------------------------------|-----------------|
| Date: 9/11/0 | | | Site: Erse | HUL | | | |
| | TION CATURNULI | A | | | | | Â. |
| | 207 | | | | | Dive: Shore | -(Boat)- Ice |
| | | | Arrangemen | nts Co-ordinat | ed by: JCR (| Ops supervisor f | an this tool |
| appoint: | M. brown | ~ 1 | | | | | |
| Signed: Non-divers in (| operation: P | ENDERCES | | | (FIEM DIVE | Jinter, on Denan o | |
| Weather/Sea S | FL | | | | | on completed | <i>18</i> . |
| Divers have r assessment to Specific Pre-dive Ris | | and the BA | S Diving Po | | Dive manual O sign: | and relevant | : risk سريور |
| Final Assessn DCIEM Sched | nent: (Circle) Lo ule: المالية | wer/Norm | Higher | | (If hig | gher, list con Safety Sto | |
| Diver 1 | Diver 2 | L/S | Depth | B/T | A/S | D/T | Dive No. |
| P. bALNES | S. Moret | 1027 | 16m | 12min | 1040 | 15000 | |
| | nal Encounter: 7 | | | | | | |
| Diver Problen | ns, Injuries etc: | Yes | | | | | |
| | gnature: | MA | row. | | | | |

| | | ROTHERA | 'ISH ANTAR RESEARCH | STATIO | N DIVE LOG | } | |
|--|--------------------------|-----------------------|------------------------|------------|--------------------------|----------------------|-----------------------------------|
| Dive Contract | or: John Duder | iey, Deputy I | Director, Britis | h Antarcti | c Survey. | | |
| | Officer: John H | fall | | | | | er: Matt Brown |
| Date: 9/11 0 Task: Conce | | Rowld | Site: Las | ETTE B | 4y. Sou | TH YOURGIA | • |
| Ali JRI | 09 | | - | nto Co. or | Nature linated by: J0 | of Dive: Sho | ore Boat - ce |
| I appoint: | M. Krow | ency suppor | Anangeme | ats Co-ort | | | or for this task. |
| Signed: | | 5~ | | | (Field I | Dive Officer, on beh | alf of John Dudeney) |
| Non-divers in (| operation: | S. MORLET K. LINSE | 1 | | | | |
| Weather/Sea S | itate: | | | Pre-div | e area observ | ation comple | eted: H |
| | ead and under | stand the BA | AS Diving Pol | icy, Roth | era Dive man | ual and relev | ant risk |
| assessment to Specific Pre-dive Ris | | | | | FDO sign: | K | . have |
| Final Assessm DCIEM Sched | nent: (Circle) L ule: | .owor/Norm | alHigher | | (If | | ontrols above) top: <u>3@6</u> |
| Diver 1 | Diver 2 | L/S | Depth | B/T | A/S | D/T | Dive No. |
| P. ENOBRIEN | W. FRASER | 1818 | 26 | 16 | 1536 | 18 | |
| Marine Mamm | al Encounter: | Vesto | | | | | |
| Cmergencies & | Actions Taker | n: Yes/160 | | | | | |
| Diver Problems | , Injuries etc: | YesNo | | | | | |
| upervisor Sign | ature: | | Grow | ، سحر | | | |
| Supervisor Sign | nature: | | Groe | حر | | | |

Appendix 2 – Species List. Numbers of phyla, classes and species recorded in shallow marine habitats of the northern coast of South Georgia Island. Notable phyla not represented amongst our observations were Brachiopoda, Entoprocta and Priapula. Sightings of Sipuncula at Rosita Harbour were uncertain (?) and several examples of a single Demosponge species (*) were present but had been dislodged and probably been carried there by prevailing currents. Table produced by Dave Barnes.

| Phylum, Class | Cumberland East Bay | Fjord | Rosita Bay | Elsehul |
|--------------------------|------------------------|-------|---------------|---------|
| | 18m | 20m | 25m | 17m |
| Annelida, Polychae | eta 3 | 3 | | 1 |
| | | | | |
| Oligochaeta | 6 | 5 | | |
| Bryozoa, Cheilostome | 0 | 5 | | |
| Cyclosto | me 1 | 1 | | |
| Chelicerata, Pycnogo | | 2 | | |
| Chordata, Ascidiac | | 4 | | 1 |
| Pisces | 1 | 1 | 1 | |
| Cnidaria, Anthozo | a 2 | 3 | | |
| Hydrozo | oa - | 1 | | |
| Crustacea, Copepoo | la | 1 | | |
| | 4 | 5 | 2 | 4 |
| Malacostraca | | | | |
| Echinodermata, | 4 | 4 | 1 | |
| Asteroidea Echinoid | dea 1 | 1 | | |
| Lennow | 1 | 1 2 | | |
| Holothuroidea | 1 | 2 | | |
| Echiura | | 1 | | |
| Mollusca, Bivalvia | 2 | 2 | 1 | |
| , | 8 | 4 | 2 | 2 |
| Gastropoda | | | | |
| Nematoda | 1+ | 1+ | 1 | |
| Nemertea | 2 | 2 | | |
| Platyhelminthes, | 1 | 1 | | |
| Turbellaria Porifera, | 2 | 3 | | 1* |
| Demospongiae | 2 | 5 | | 1 |
| - • | | 2 | | |
| Hexactinellida | | | | |
| Sipuncula | | | 1? | |
| Uniramia, Hexapod | | | | |
| Species Richness | 42 | 49 | 9 | 9 |