Dive Plan 4904—May 7, 2017

**Port:** Jeremy Rich  **Starboard:** Ashley Grosche  **Pilot:** Pat Hickey

**On Bottom Target:** Teddy Bear

Objectives:
- Release LVP at Teddy Bear
- Find site where CV1 was deployed and pick up colonizer
- Move to Crab Spa to check on Vent-SID
- Pick up CV8 at ‘Wedding Cake’
- Collect piece of ‘Wedding Cake’ with Alvinella
- Pick up CV5 at Bio9
- Pick up Crab Trap at Riftia mound near Bio9

Basket List
1. Large biobox
2. 2 small bioboxes
3. 2 medium biobox
4. T probe

<table>
<thead>
<tr>
<th>Locations</th>
<th>Lat</th>
<th>Long</th>
<th>m</th>
<th>x</th>
<th>y</th>
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<tbody>
<tr>
<td>Pvent</td>
<td>9 50.276</td>
<td>104 17.474</td>
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<td>Bio9</td>
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<td>104 17.476</td>
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<td>Crab Spa MkF</td>
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<td>4600</td>
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<td>Tica</td>
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<td>Teddy Bear</td>
<td>9 50.50</td>
<td>104 17.51</td>
<td>2514</td>
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<tr>
<td>CV1</td>
<td>x4535, y78387, hdg195, d2519</td>
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1. On bottom, transit to Teddy Bear
2. Take out wand of LVP
3. Measure T in crack
4. Secure wand in holster
5. Release LVP
6. Find site of CV1 deployment near Teddy Bear (x4535, y78387, hdg195, d2519)
7. For picking up colonizer, move extremely slowly and gently put in small biobox
8. Measure T at point where colonizer was

9. Move to Crab Spa to check on Vent-SID

10. When still no sign of activity, release Vent-SID

11. Proceed to Alvinella mound (Wedding Cake) near Crab Spa and recover CV8

12. For picking up colonizer, move extremely slowly and gently put in medium biobox

13. Measure T at point where colonizer was

14. Collect piece of Wedding Cake and put in one of bioboxes not used for colonizers

15. Measure T of fluids emanating from broken off piece

16. Sample Riftia around Tica (not quite dead yet Riftia)

17. Before collecting Riftia, proceed with following:
   a. Measure T at base of Riftia colony
   b. Make a T measurements at the level of various plumes

18. Proceed with collection and put worms in large biobox. Make sure worms fit into biobox and nothing sticks out. Don’t fold them

19. Move to Bio9 and recover CV5

20. For picking up colonizer, move extremely slowly and gently put in remaining small or medium biobox

21. Measure T at spot where colonizer was

22. Recover Crab Trap at Riftia mound close to Bio9
Alvin Dive 4904-AT37-12
MAY 7, 2017

Pilot: Pat Hickey
Port Observer: Jeremy Rich
Starboard Observer: Ashley Grosche
Notes are a combination of Jeremy Rich’s and Ashley Grosche’s notes.

<table>
<thead>
<tr>
<th>GMT</th>
<th>Comments</th>
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<tbody>
<tr>
<td>14:00</td>
<td>Descending to the seafloor</td>
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<tr>
<td>15:25</td>
<td>At seafloor, transiting to Teddy Bear</td>
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<tr>
<td>15:40</td>
<td>Arrival at Teddy Bear near Large Volume Pump (LVP) (x4546, y78368, Hdg332, d2516, temp at LVP inlet is 12°C)</td>
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<tr>
<td>15:47</td>
<td>Taking LVP off axis</td>
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<tr>
<td>15:50</td>
<td>Releasing LVP to surface</td>
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<tr>
<td>16:08</td>
<td>North of Teddy Bear, collecting colonizer CV1-2017 (x4525, y78405, Hdg4, d2516, temp 12°C)</td>
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<td>16:35</td>
<td>At Alvinella Mound (Wedding Cake) collecting colonizer CV7-2017. Metal screen gone, sulfide growing into colonizer (x4577, y78160, Hdg76, d2511, temp 46°C)</td>
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<tr>
<td>16:40</td>
<td>At Alvinella Mound (Wedding Cake) collecting Alvinella worms (x4577, y78160, Hdg76, d2511, temp 40-46°C)</td>
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<td>16:45</td>
<td>At Tica collecting 8-10 Riftia from a dying Riftia patch (x4575, y78166, Hdg 138, d2515, temp at base of worm 2°C, temp at plume 3°C)</td>
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<tr>
<td>17:06</td>
<td>At Crab Spa to inspect Vent-SID. It doesn’t appear to be working (x4584, y78156, Hdg85, d2505)</td>
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<td>17:18</td>
<td>Leaving Crab Spa with Vent-SID to go off axis</td>
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<td>17:28</td>
<td>Releasing Vent-SID (x4661, y78139, Hdg41, d2503), heading to Bio9</td>
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<td>17:39</td>
<td>At Bio9 collecting colonizer CV5-2017 from white pillar next to black smoker chimney (x4611, y77985, Hdg53, d2510, temp 10.4°C)</td>
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<td>17:46</td>
<td>Collecting crab trap (x4622, y77965, Hdg11.5, d2510)</td>
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<td>17:49</td>
<td>Near Bio9, collecting 6-8 mussels into biobox (x4622, y77967, Hdg112, d2511)</td>
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<td>17:55</td>
<td>At Bio9 attempting to collect large crab with Alvin arm unsuccessfully. Transit to Biovent</td>
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<td>18:53</td>
<td>Vent-SID surfaces</td>
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<td>19:36</td>
<td>Start ascent to the surface</td>
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AT 37-12 Sample Sheet

Alvin Dive# 4904  Date 5/7/17  Logged by Ashley Grosche
Port Obs. Jeremy  Starboard Obs. Ashley  Pilot  Pat Hurley
Descend: 1400  At Seafloor: 15:33  Ascend: 19:36:25

FLUID SAMPLES

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LARGE VOLUME Pump Release

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Comments

BIOLOGICAL SAMPLES

Take photos before collection, in the claw (if possible), and after collection.
If needed, make sketches with scales.

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<tr>
<td>1</td>
<td>10:22:40</td>
<td>40-46°C</td>
<td>Bio 9</td>
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| X 4577 Y 3860 | Hdg 76  | Depth 25.11  | Alt  Marker (type/#) |

Sample type Alvin IIIA warming casings
Basket location Starboard medium
Assoc. water sample # ________ Assoc. rock sample # ________ (type) ________
Description of associated fauna &/or type of venting __________________________

Sample # (2) Time 16:46 Temp 30°C - 33°C Vent TICA
X Y 172 15° Hdg 139° Depth 2515 Alt ______ Marker (type/#) ________
Sample type Sickly Riftia (8-10) Basket location Large biobox

Assoc. water sample # ________ Assoc. rock sample # ________ (type) ________
Description of associated fauna &/or type of venting Riphip crabs, limpets, mussels

Sample # (3) Time 17:47-39 Temp ________ Vent Bioq Rim nord
X Y 172 15° Hdg 12° Depth 2510 Alt ______ Marker (type/#) ________
Sample type Crab Trap Basket location Big bio box

Assoc. water sample # ________ Assoc. rock sample # ________ (type) ________
Description of associated fauna &/or type of venting Crabs + mussels

Sample # (4) Time 17:50-67 Temp ________ Vent near Bioq
X Y 172 15° Hdg 113° Depth 2511 Alt ______ Marker (type/#) ________
Sample type Mussel Basket location Big bio box

Assoc. water sample # ________ Assoc. rock sample # ________ (type) ________
Description of associated fauna &/or type of venting __________________________

Sample # ________ Time ________ Temp ________ Vent ________
X ______ Y ______ Hdg ______ Depth ______ Alt ______ Marker ________(type/#) ________
Sample type ________ Basket location ________
Assoc. water sample # ________ Assoc. rock sample # ________ (type) ________
Description of associated fauna &/or type of venting __________________________

Sample # ________ Time ________ Temp ________ Vent ________
X ______ Y ______ Hdg ______ Depth ______ Alt ______ Marker ________(type/#) ________
Sample type ________ Basket location ________
Assoc. water sample # ________ Assoc. rock sample # ________ (type) ________
Description of associated fauna &/or type of venting __________________________

Sample # ________ Time ________ Temp ________ Vent ________
X ______ Y ______ Hdg ______ Depth ______ Alt ______ Marker ________(type/#) ________
Sample type ________ Basket location ________
Assoc. water sample # ________ Assoc. rock sample # ________ (type) ________
Description of associated fauna &/or type of venting __________________________

Sample # ________ Time ________ Temp ________ Vent ________
X ______ Y ______ Hdg ______ Depth ______ Alt ______ Marker ________(type/#) ________
Sample type ________ Basket location ________
Assoc. water sample # ________ Assoc. rock sample # ________ (type) ________
Description of associated fauna &/or type of venting __________________________
Sample type

Basket location

Assoc. water sample # ______ Assoc. rock sample # ______ (type) ______

Description of associated fauna &/or type of venting

**ROCK SAMPLES:**  **No Rock Samples Taken**

*Take photos before collection and in the claw. If needed, make sketches w/ scales.*

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Descriptive comments

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Descriptive comments
EXPERIMENT DEPLOYMENTS/RECOVERIES

Take photos before and after deployment or recovery. Make sketches with scales.

Expt ID#/ CV-2017 Time 10:13.76 Temp 12°C Vent North & Teddy Bean

X 43°25' Y 38°45' Hdg N Depth 2519 Alt Marker (type/#)

Description of associated fauna &/or type of venting: limpets, fish, shrimps, crabs

Additional assoc. samples: type/ID

Additional descriptive comments

Expt ID#/ CV-2017 Time 16:29.48 Temp 40-46° Vent Tica

X 43°37' Y 38°16' Hdg E Depth 2511 Alt Marker (type/#)

Description of associated fauna &/or type of venting: Elgents (long white) on columnar marker, white mud, rapid venting, heavy-armed

Additional assoc. samples: type/ID

Additional descriptive comments: brown squids on top of chimney on type of alveolata pipe

Expt ID#/ VENT-SID Time 1:10:21 Temp 2°C Vent Crab Spa

X 43°34' Y 38°56' Hdg E5 Depth 2505 Alt Marker (type/#)

Description of associated fauna &/or type of venting

Additional assoc. samples: type/ID

Additional descriptive comments

Expt ID#/ VENT-SID Time 17:28:24 Temp 28°C Vent Off Axis

X 46°11' Y 38°13' Hdg 41 Depth 2503 Alt Marker (type/#)

Description of associated fauna &/or type of venting: Release of Vent SID

Additional assoc. samples: type/ID

Additional descriptive comments: surfaced 8:53


X 46°11' Y 37°46' Hdg 61 Depth 2509 Alt Marker (type/#)

Description of associated fauna &/or type of venting: White Gillan very close to black smoker, chimney, coloures not different from

Additional assoc. samples: type/ID

Additional descriptive comments: what Pat remembers
MARKERS DEPLOYED

Time __________ Marker type ______________ Marker # ______________
X ______ Y ______ Hdg ______ Depth ______ Alt ____ Marker ________ (type/#)
Reason/ assoc. sample(s) __________________________________________
Comments _______________________________________________________

Time __________ Marker type ______________ Marker # ______________
X ______ Y ______ Hdg ______ Depth ______ Alt ____ Marker ________ (type/#)
Reason/ assoc. sample(s) __________________________________________
Comments _______________________________________________________

Time __________ Marker type ______________ Marker # ______________
X ______ Y ______ Hdg ______ Depth ______ Alt ____ Marker ________ (type/#)
Reason/ assoc. sample(s) __________________________________________
Comments _______________________________________________________

ADDITIONAL NOTES:
AT 37-12 Sample Sheet

Alvin Dive# 4904
Date 5/7/17
Logged by Jeremy Rich
Port Obs. Jeremy Rich
Starboard Obs. Ashley Grosche
Pilot Pat Hickey
Descend: 1480
At Seafloor: 1525
Ascend: 1937

FLUID SAMPLES

Major# Time Temp ICL Vent
X Y Hdg Depth Alt Marker (type/#)
Comments

Major# Time Temp ICL Vent
X Y Hdg Depth Alt Marker (type/#)
Comments

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Major# Time Temp ICL Vent
X Y Hdg Depth Alt Marker (type/#)
Comments

BIOLOGICAL SAMPLES

Take photos before collection, in the claw (if possible), and after collection.
If needed, make sketches with scales.

Sample # Time 1640 Temp 46°C Vent Wedding Cake
X Y 4577 78160 Hdg 90 Depth 2511 Alt Marker (type/#)
Sample type Wall of Alvinella mound
Basket location Medium starboard
Sample # Riffia Time 1645 Temp base 3 pysc Vent Tica area
X 4575 Y 78166 Hgd 138 Depth 2515 Alt Marker (type/#)
Sample type 8-10 Riffia were sampled from
cracking
Basket location
Assoc. water sample # _______ Assoc. rock sample # _______ (type) _______
Description of associated fauna &/or type of venting

Sample # Mussel Time 1744 Temp Vent near B109
X 4622 Y 2796 Hgd 112 Depth 2511 Alt Marker (type/#)
Sample type 6-8 mussel
Basket location large box
Assoc. water sample # _______ Assoc. rock sample # _______ (type) _______
Description of associated fauna &/or type of venting

1755 - Attempted to collect large crab with Alvin arm and were not able to
Sample # _______ Time _______ Temp _______ Vent _______
X _______ Y _______ Hgd _______ Depth _______ Alt ______ Marker _______ (type/#)
Sample type
Basket location
Assoc. water sample # _______ Assoc. rock sample # _______ (type) _______
Description of associated fauna &/or type of venting

Sample # _______ Time _______ Temp _______ Vent _______
X _______ Y _______ Hgd _______ Depth _______ Alt ______ Marker _______ (type/#)
Sample type
Basket location
Assoc. water sample # _______ Assoc. rock sample # _______ (type) _______
Description of associated fauna &/or type of venting

Sample # _______ Time _______ Temp _______ Vent _______
X _______ Y _______ Hgd _______ Depth _______ Alt ______ Marker _______ (type/#)
Sample type

Basket location

Assoc. water sample # ________ Assoc. rock sample # ________ (type) ________

Description of associated fauna &/or type of venting

ROCK SAMPLES

*Take photos before collection and in the claw. If needed, make sketches w/ scales.*

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EXPERIMENT DEPLOYMENTS/RECOVERIES

Take photos before and after deployment or recovery. Make sketches with scales.

Expt ID/# Time 1541 Temp 12°C Vent Teddy Bear
X 45.46 Y 77882 Hdg 332 Depth 2516 Alt Marker (type/#)
Description of associated fauna &/or type of venting Took T at same location
Additional assoc. samples: type/ID
Additional descriptive comments

Expt ID/# CV1 Time 1608 Temp 12°C Vent north of Teddy Bear
X 45.25 Y 78405 Hdg 4 Depth 3519 Alt Marker (type/#)
Description of associated fauna &/or type of venting Collected colonizer and took Temp
Additional assoc. samples: type/ID
Additional descriptive comments

Expt ID/# CV2 Time 1635 Temp 46°C Vent Wedding Cake
X 45.77 Y 7860 Hdg 76 Depth 2511 Alt Marker (type/#)
Description of associated fauna &/or type of venting Cake heavily colonized.
Additional assoc. samples: type/ID
Additional descriptive comments

Expt ID/# Vent S10 Time ________ Temp ________ Vent Crab Spa
X ______ Y ______ Hdg ______ Depth ______ Alt Marker (type/#)
Description of associated fauna &/or type of venting 1706 at Crab Spa to inspect Vent - S10. It's not working. 1718 leaving Crab Spa with Vent - S10 to go off axis.
Additional assoc. samples: type/ID
Additional descriptive comments

Expt ID/# CV5 Time 1739 Temp 10.4°C Vent Bio9
X 46.11 Y 77985 Hdg 53 Depth 2510 Alt Marker (type/#)
Description of associated fauna &/or type of venting Put in small port side box
Additional assoc. samples: type/ID
Additional descriptive comments

Crab trap time 1746 temp near Bio9 — crab trap
x 46.22 y 77965 Hdg 111.5 d 2510 collected
MARKERS DEPLOYED

Time 17:45 Marker type __________ Marker # __________
X _______ Y _______ Hdg _______ Depth _______ Alt ____ Marker _________ (type/#)
Reason/ assoc. sample(s) ____________________________________________
Comments _________________________________________________________

Time __________ Marker type __________ Marker # __________
X _______ Y _______ Hdg _______ Depth _______ Alt ____ Marker _________ (type/#)
Reason/ assoc. sample(s) ____________________________________________
Comments _________________________________________________________

Time __________ Marker type __________ Marker # __________
X _______ Y _______ Hdg _______ Depth _______ Alt ____ Marker _________ (type/#)
Reason/ assoc. sample(s) ____________________________________________
Comments _________________________________________________________

ADDITIONAL NOTES: