Cruise Report No. 6

RRS Charles Darwin Cruise 169

17 FEB - 19 MAR 2005

Hydrothermal exploration of the southern Mid-Atlantic Ridge

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2006

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ABSTRACT

The principal objective of this cruise was to identify the first site or sites of high temperature hydrothermal venting anywhere on the southern Mid-Atlantic Ridge, to characterize their geological setting, preliminary chemical nature and to identify, where possible, the nature of any vent-endemic species that might inhabit such vents to investigate whether this ridge system might represent a new biogeographic province. Initially we used the TOBI deep-tow sidescan system equipped with a CTD system and optical backscatter sensors, together with Miniature Autonomous Plume Recorders (MAPRs) to identify two new sites in which diagnostic chemically- and particle-laden plumes indicated the presence of high-temperature hydrothermal venting. Subsequently, we used the ABE autonomous underwater vehicle to (1) locate the core of one of these hydrothermal plumes, (2) obtain a detailed map of the underlying seafloor and (3) photograph three discrete hydrothermal sites (2 black-smoker systems, 1 diffuse-flow) and their associated ecosystems. A series of CTD stations were occupied for water column investigations and a number of rock-coring and dredging stations were also undertaken to provide groundtruthing of sidescan sonar images of the Mid-Atlantic Ridge seafloor.

KEYWORDS

ATLSE, BRIDGET, Charles Darwin, Cruise 169 2005, CTD, EM-12, ABE. hydrothermal activity, MAPRs, Mid-Atlantic Ridge, Red Lion, South Atlantic Turtle Pits, vent sites, Wideawake Ocean, TOBI.

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ITINERARY

Departed:	Mindelo, Cape Verdes	17 Feb 2005
Port-call:	Georgetown, Ascension	04 Mar 2005
Arrived:	Georgetown, Ascension	18 Mar 2005

OBJECTIVES

The objectives of the cruise were three-fold:

(1) To locate and investigate the geologic setting of hydrothermal vent-plumes along the southern Mid-Atlantic Ridge, 2-7°S using TOBI equipped with in situ sensors.

(2) To precisely locate the first sites of venting to be found anywhere on the Southern MAR, using the ABE autonomous underwater vehicle equipped with in situ sensors.

(3) To obtain first geochemical, petrological and biological sampling and characterization of any new hydrothermal field and its surrounding environment.

NARRATIVE

Leg 1

The SOC scientific party for RRS *Charles Darwin* Cruise 169 arrived in Mindelo, Cape Verdes on 15^{th} February 2005. Upon arrival in port, the ship was boarded (Feb 16th) ready to sail next day. With all gear and scientific party on board, the ship departed Mindelo, Cape Verdes at 09:30 (GMT) on 17 Feb (Julian Day 048) bound for the South Atlantic. After 24 hours of transit a preliminary test deployment of the CTD was conducted , to 500m, to aid with cleaning of the rosette's 10-L Niskin bottles (JD 49). As soon as this was completed, the TOBI deep-tow cable was streamed with a 450kg weight attached – an operation planned for the transit from Lisbon to the start of CD168 but which had not yet been completed. Once back inboard, full transit speed was resumed and at 11:32z on JD 050, multibeam mapping was commenced in international waters close to the Sierra Leone Rise. A total of ca.6.25 days transit was required to reach our planned study area, with the Equator being crossed at 16:23z on Julian Day 053. Due to high surface water temperatures close to the equator (often >30°C), ineffective operation of the ship's engines' cooling system required that transit speeds were often reduced significantly below 10kts during the course of the transit south, significantly delaying our initially-predicted arrival in the work area.

Scientific operations commenced on JD 054 (14:14z) with a multi-beam swath bathymetric survey along the length of the Mid-Atlantic Ridge axis from 02°34.20'S, 12°30.00'W as far as 05° 07.85'S, 12°18.54'W. Rather than complete our original multibeam survey plans, this swath mapping was interrupted at 10:00z on JD 55 when it was decided, for efficiency, to commence TOBI operations. Our goal was to survey this section of the ridge crest as efficiently available in the reduced time available using a single pass of the TOBI deep-tow sidescan vehicle rather than a double-swath as has more traditionally been used when investigating the Mid-Atlantic Ridge rift-valley.

Deployment of the TOBI deep-tow vehicle was commenced at 11:00z on JD 055 at 05°11.40'S, 12°17.80'W. Full deployment of TOBI + 6 MAPRs was complete by 12:26z and by 12:56z the TOBI vehicle was on course (ship's position 05°12.00'S, 12° 17.52'W) and being lowered to the seafloor to commence it's northward survey. Acquisition of survey data commenced at 15:20z when TOBI arrived at 800m above the seafloor. Ship's position at this time was 05°06.23'S, 12° 18.19'W. TOBI continued north with two minor computer failures at 18:45 on JD 055 and at 01:14 on JD 056. In the second case, no CTD etc data were acquired for ca.2 hours until 03:00z on JD 056. The TOBI survey continued north as far as ship's position 03° 58.61'S, 12° 11.68'W when, at 00:30z on JD 057 the TOBI system suffered a significant failure. The vehicle was recovered to 1000m wire-out by 04:56z and recovered in-board under daylight between 06:30 and 08:11z.

Next, a first scientific CTD station (CTD-01) was occupied at 04° 04.60'S 12° 16.19'W to a water depth of 4858m. The CTD station commenced at 09:54 on JD 057 and was recovered in-board at 13:15z. Following a brief test of the TOBI umbilical cord (13:53-14:08z) a first rock-core station was occupied at 04° 11.31'S 12°18.05'W in 3131m water depth. The rock corer was deployed at 15:10z on JD 057 and recovered at 18:30z. This station was not without mishap - it included a brief delay (17:52-18:05z) due to winch failure. Once the problem with the winch was confirmed resolved together with news that the TOBI system was not yet ready for further testing, a 2nd CTD station was occupied at 04° 00.34'S, 12° 13.05'W in 4222m. CTD-02 was deployed at 21:45z on JD 057 and recovered in-board at 01:27 on JD 058. Following this, a series of three further rockcore stations were occupied (RC-02, -03 and -04) at 04°6.10'S, 12°18.10'W; at 04°08.70'S, 12° 18.11'W and at 04°13.88'S, 12° 17.18'W respectively. Deployment times for these stations, in water depths of 3535m, 3350m and 2962m were 02:25-04:55z, 06:05-08:04z and 08:52-10:33z. By the end of this sequence the TOBI engineering team had completed their repairs and were ready to redeploy. To ensure overlap in our acquired sonar surveys - including re-interception of a hydrothermal plume revealed by MAPR data during the previous TOBI recovery, the ship was transitted SW from 04°13.77'S, 12°17.06'W at 10:40z on JD 058 to 04°05.49'S, 12°19.56'W (10:40-11:45z) prior to TOBI redeployment.

TOBI Leg 2 deployment was commenced at 13:02z on JD 058 and the complete system, including 6 MAPRs strung below and above the depressor weight that connects via the umbilical to TOBI itself were successfully deployed by 14:22z and data acquisition was commenced by 17:00z. The rest of this TOBI survey was conducted successfully, continuing until 15:00z on JD 059 when recovery of the vehicle at the northern limit of our detailed studies ended. The full TOBI + MAPR system was recovered in-board at 18:25z on JD 059 at ship's position 03°14.60' 12° 10.05'S. From 18:35z on JD059 the ship transmitted almost due south until 08:00z on JD060 ready for our third and final TOBI deployment.

TOBI leg 3 was commenced at 08:30z on JD 060 at 04°55.85'S 11°38.36'W. Full deployment of the TOBI + MAPR system was completed at 09:28z and TOBI was on course by 11:33z and acquiring sidescan sonar data before 12:00z. With the exception of some intermittent problems with the TOBI phase bathymetry system (06:18-07:12z on JD 061 and 05:16-05:21z on JD 062) the majority of TOBI leg 3 was conducted very successfully. At 06:52z on JD 062, however, Ship's power was lost completely while TOBI was still deployed to a wire out of >6,500m, surveying ca.350m above the seafloor approximately 6km astern of the ship. At 07:08z (16 minutes later) power was restored and the ship's speed increased to 2.9kts to prevent TOBI colliding with the seafloor. A further 25 minutes later (07:33z) winch power was obtained once more and TOBI operations recommenced. Approximately 80 minutes later, regrettably, all ship's power was lost once more (08:50z, JD 062). On this occasion TOBI was deployed with almost 7,000m of wire out, surveying 350- 400m above the seabed ca.6km behind the vessel. Although ship's power was restored very promptly on this occasion (08:53z) it still took a further 5 minutes to restore power to the scientific winches and hauling of the vehicle was commenced at 09:00z. At 09:02z communication was regained with the vehicle. During 12 minutes the vehicle had descended from

380m above the seafloor to 274m up at a rate of >8m/minute. Rather than fail to complete all aspects of our survey, the TOBI vehicle was now raised to >500m above the seafloor to complete our final period of survey (from 09:10z onward) – sufficiently deep to continue geophysical mapping but too shallow to have any merit for hydrothermal operations. Recovery of the TOBI vehicle was commenced at 10:32z on JD 062, enabling a complete single-swath sidescan survey to be completed all the way to the Ascension Fracture Zone. The full system of TOBI+MAPRs was recovered inboard between 13:01 and 14:05z on JD 062 at 06°48.63'S, 11°13.84'W. At that time course was made directly for Georgetown, Ascension Island (07° 54.00'S, 14° 25.02'W) where Leg 1 of cruise CD 169 ended (09:15z, JD 063).

Leg 2

Having embarked the 5-person ABE team from WHOI, USA, Leg 2 of Cruise CD 169 commenced with departure from our position anchored off Ascension Island at 17:00z on JD 063. Our target for Leg 2 of the cruise was the southern of two new hydrothermal plume sites located in the 2nd-order volcanically active ridge-segment at 5°S. During transit we attempted an off-axis background CTD station, CTD-03. The CTD rosette was deployed at 07:15z an lowered to 3390m at 6° 06.27'Sm 13°14.78'W. However, a fault was identified with the rosette CTD system that prevented any Niskin bottles from being fired and, hence, from any water samples being collected. The system was recovered inboard at 10:04z and transit continued toward the work area. At 13:18z a test station was occupied (5°41.90'S, 13°00'W) and the CTD-rosette lowered to 500m. Upon recovery in-board (14:05z) all 24 Niskin bottles were tripped successfully and it was decided to conduct a full background station immediately before proceeding. Station CTD 04 (5° 42.52'S, 12° 59.56'W) was commenced at 14:30z. The CTD-rosette was lowered to 3481m depth and recovered in-board at 17:26z after all 24 bottles had been fired.

At 23:45z on JD 064, the ship arrived back at the MAR ridge-crest and two rock-core stations were occupied. RC-05 (5° 06.91'S, 12° 19.17'W) was commenced at 23:55z, deployed to 3380m and recovered in-board at 01:39z on JD 065. RC-06 (5° 04.02'S, 12° 17.29'W) was commenced at 03:40z, deployed to 3599m and recovered in-board at 05:51z. From 05:57z until 08:15z an additional line of swath bathymetric mapping was conducted to provide a more comprehensive coverage of the segment prior to ABE deployment, between 4°54.05'S, 12° 25.90'W and 4° 43.93'S 12° 28.26'W and demarcating the western boundary of the segment-centre's rift-valley. Upon completion of this swath survey, the first ABE transponder (TX-01) was deployed at 10:04z at 4° 47.91'S 12° 24.72'W. Transponder 'D' reached the seabed at 10:51z and the required navigation survey was completed approximately 1 hour later at 11:55z.

At 13:09z on JD 065, station CTD-05 was occupied at 04° 45.98'S, 12° 23.01'W. The deployment was commenced at 13:09z but a fault was detected at 13:19z after lowering to just 50m depth. The vehicle was hauled out of the water but not recovered in-board at 13:27z and redeployed at 13:33z after being re-set. At 13:44z the CTD computer system failed again (CTD @ 100m water depth) and was re-set. With no visual display but digital data available it was decided to continue with the cast and the CTD was deployed to 3146m at 14:51z. Immediately upon attempting to fire Niskin bottles through the rosette command system, however, the CTD suffered a major system failure and was recovered in-board at 15:54z with no water samples taken. At 16:45z, the first BRIDGET tow-yo of the cruise was attempted. Deployment of BGT-01 commenced at 17:10z at 4° 43.26'S, 12° 25.07'W. The vehicle was lowered to the proposed survey depth of 2720m at 19:01z having reported numerous operating errors throughout the deployment, Test firings of the BRIDGET rosette were continued until 19:28z and the vehicle was recovered inboard at 20:55z at 4° 44.95'S, 12°23.05'S still north of the segment centre and without any useable data recorded. At this stage

neither the CTD-rosette nor the BRIDGET deep-tow vehicle were operational to guide our hydrothermal exploration programme as intended.

At 22:20z on JD 065, our second transponder (transponder 'B') was deployed at 4° 47.28'S, 12° 21.33'W (TX-02) followed by the third and final transponder (transponder 'A') which was deployed at 4° 49.53'S, 12° 22.47'W (TX-03) at 02:40z on JD 066.

In the continuing absence of either operational system from RSU intended for conducting hydrothermal plume detection and location it was decided to improvise by deploying a series of self-recording MAPR plume-instruments at fixed intervals along the TOBI deep-tow cable attached to the depressor weight. Deep Underwater MAPR deployments (DUM-01) was commenced at 05:30z on JD 066 at 4° 48.80'S, 12° 26.14'W, south of the segment centre. A series of way-points were selected for the ship to sail a grid although the only navigational aid on the DUM instrument-package as deployed was a pinger to detect height off-bottom. After multiple attempted passes across the breadth of the seafloor, from south to north, the DUM-01 system was recovered in-board at 05:46z on JD 067 at 04° 45.72'S 12° 28.71'W, north of the segment centre.

Following the DUM-01 recovery, two rock-core stations were occupied. RC-07 (4° 48.64'S, 12°23.24'W) was commenced at 07:34z but recovered at 07:52z and only re- deployed in the correct location at 08:37z on JD 067. The package was deployed to 3129m at 09:24z and recovered inboard at 11:19z after further delay due to a winch failure encountered during recovery of the rock-corer. RC-08 (4° 46.24'S, 12° 22.62'W) was less troublesome. After arriving on station at 11:33z, the rock-corer was deployed at 12:02z, deployed to 3143m by 12:57z and recovered inboard at 14:00z.

Following a brief transit, a CTD test-deployment was conducted to 500m at 4° 48.50'S 12° 21.17'W (15:00-15:42z) and then preparations were made for first deployment of the ABE autonomous underwater vehicle. Dive ABE-150 commenced with deployment at 4° 48.50'S, 12° 21.10'W – launch operations commenced at 16:20z and the vehicle was released at 16:35z. Tracking of the vehicle was continued until 18:00z and transit was then made to the next CTD station.

Station CTD 06 was occupied at 4° 49.74'S, 12° 21.82'W. The system was deployed at 18:30z on JD 067, lowered to 2890m at 19:45z and recovered in-board at 21:25z. A further station, CTD 07, was then occupied at 4° 46.95'S, 12° 23.55'W. This station was commenced at 23:15z on JD 067. The CTD-rosette reached a maximum depth of 2995m at 00:17z on JD 068 and was recovered inboard at 01:42z. Following these two CTD stations, three rock-cores were collected. RC-09 (4° 48.89'S, 12° 22.91'W) was commenced at 03:00z. The rock-corer was deployed to 3034m at 03:44z and recovered in-board at 04:40z. RC-10 (4° 47.67'S, 12° 22.00'W) was commenced at 05:45z, deployed to 3086m at 06:33z and recovered in-board at 07:32z. Rock core RC-11 (4° 50.93'S, 12° 22.25'W) was commenced at 08:43z, deployed to 3155m at 09:40z and recovered in-board at 10:45z.

Following stem-down (for ABE tracking) transit, station CTD 08 (4° 48.65'S, 12° 21.81'W) was commenced at 11:50z deployed to 2852m at 12:57z and recovered in-board at 14:45z. At this time a problem was found with the hydrowire and all science operations had to be suspended for a further ca.4.5 hours from 15:00 until 19:25z until the problem was resolved.

CTD 09 (4° 47.68'S, 12° 22.03'W) was commenced at 19:31z on JD 068, deployed to 2985m at 20:40z and recovered in-board at 21:55z. At this stage it was considered incautious to commence any further over-the-side operations prior to ABE recovery. Instead, the ship was transitted to the AEB recovery position, arriving on-location at 22:45z at 4° 47.44'S, 12°24.58'W. ABE surfaced at 23:40z on JD 068 and dive ABE 150 was completed with recovery in-board at 00:32z on JD 069.

A series of four rock-cores were occupied next. RC-12 (4° 45.97'S, 12° 23.84'W) was commenced at 01:42z on JD 069 but only reached the seafloor at 3062m at 04:35z due to a hydraulic pipe rupture that interrupted operations from 01:52z to 03:40z – a further 2 hours of lost science time. The station was finally completed at 05:40z. RC-13 (4° 47.44'S, 12° 24.66'W) was commenced at 06:18z, deployed to 2831m at 07:15z and recovered in-board at 08:11z. RC-14 (4° 49.59'S 12° 24.05'W) was commenced at 0907z, deployed to 2884m at 10:02z and recovered in-board at 11:05z. Finally, RC-15 (4° 50.18'S, 12°23.23'W) was commenced at 11:31z, deployed to 3051m at 12:30z and then recovered in-board at 13:40z. Over-the-side science operations were then interrupted to proceed to the ABE 151 launch site.

Having arrived on station at 4° 48.53'S, 12° 48.53'W, ABE was not yet ready for deployment. Instead a further CTD test-deployment was conducted to 500m (1705-1736z, 4° 48.68'S, 12° 23.01'W). ABE deck-testing was completed at 18:04z and at 18:53z on JD 069, dive ABE 151 was commenced at 4° 48.57'S, 12° 22.95'W. Following monitoring of ABE;s descent to the seafloor, station CTD 10 was occupied close by at 4° 47.95'S, 12° 22.51'W. The system was launched at 19:50z, deployed to a maximum depth of 2985m at 20:54z and recovered in-board at 22:28z. At that time the USBL navigation pod was raised and transit commenced to the north leaving ABE Dive 151 in progress at the segment centre.

At 01:30z on JD 070, the ship arrived on station to commence dredge DR-01. This station commenced at 4° 38.27'S, 12°25.46'S, deployed to the seafloor at 3596m between 03:00 and 05:35z and was recovered in-board at 07:35z at 4° 39.11'S, 12° 24.80'W. The ship then returned south conducting two further swath survey lines in the northern portion of the ridge segment (08:17z-09:35z) before re-deploying the USBL stem ready for station CTD-11 (4° 48.57'S, 12° 22.33'W) followed by ABE recovery. Deployment for CTD-11 was commenced at 10:48z, reached a maximum depth of ca.2980m at 11:46z and was recovered inboard at 13:21z. A 3.5 hour delay then resulted while awaiting ABE's return from the seafloor.

At 17:00z, dive ABE 151 was completed with recovery of the AUV inboard at 4° 47.50'S, 12° 23.20'W. A further period of swath mapping was conducted next, north of the segment centre once more (17:25-19:50z) en route to a further dredge station. Station DR-02 was commenced at 4°44.33'S, 12° 23.41'W at 20:10z on JD 070. The dredge was deployed to the seafloor at 3247m between 21:50 and 22:50z and recovered in-board at 00:43z on JD 071 at 4°45.33'S, 12° 21.90'W.

Returning to the segment centre, the ship arrived on station for CTD 12 at 01:25z on JD 071. Upon arriving on station, however, a further problem with the CTD-rosette was encountered. Station CTD 12 was attempted again at 04:14-04:37z (4° 47.86'S, 12° 22.56'W) but immediately upon entering the water significant errors were encountered. At 07:01z the CTD system was ready for re-deployment once more but, again, significant problems were encountered with the system and the station was abandoned at 07:13z. Once again, we were without any mechanism for meaningful water column hydrothermal plume investigations and over-the-side water column operations were brought to a complete stop. Fortunately AUV operations continued.

At 1030z on JD 071 ABE passed its deck-test for dive 152 and was ready for launch at 1100z when the ship's crane suffered an untimely failure. Dive ABE 152 was subsequently initiated at 12:52 with the vehicle launched at 4° 48.69'S, 12° 22.51'W. The vehicle was tracked to the seafloor and confirmed to have started its mission successfully at 15:30z. In the continuing absence of an operational CTD system it was decided, next, to attempt a further operational test of the BRIDGET system previously deployed on JD 065.

BRIDGET tow-yo BGT-02 commenced at 17:24 on JD 071 at 4°45.80'S, 12° 23.70'W. The vehicle was deployed to ca.2800m by 19:44z although by that time it had suffered multiple system

crashes starting at 18:11z with the instrument at less than 1500m depth (i.e. ca. half desired operational depth for this cruise). At depth operations were continued, with multiple system resets required until 20:39z at which point recovery was commenced. The BGT-02 deployment was concluded at 22:49z on JD 071 at 4° 50.13'S, 12° 21.89'W. Although the tow-yo conducted had approached and ended directly above hydrothermally active centre of this second-roder ridge segment, no useable data had been acquired. This vehicle was supposed to operate as the instrument of choice for Leg 2 of cruise CD169 to guide subsequent ABE operations. Instead, half of the shiptime available for this leg had now expired, ABE was already conducting its first nearbottom vent-location dive, but the BRIDGET vehicle was still inoperational, as was the conventional CTD-rosette.

For the next operation, rock core station RC-16 was occupied at 4° 48.28'S, 12° 21.51'W. The corer was deployed at 01:30z on JD 072, deployed to 2898m at 02:29z and recovered inboard at 03:40z. The ship then transitted to the recovery position for ABE arriving on station at 04:05z. ABE surfaced at 05:45z and was recovered in-board at 05:15z at 4° 48.64'S, 12° 23.03'W. A series of swath survey lines were then occupied extending through the southern portion of the segment between 4° 49.8'S and 5° 08.2'S and then extending along the eastern and western boundaries of the previously mapped segment centre, 4° 32-49'S. This swath survey was conducted between 06:45z and 18:06z including brief interruption for a CTD test-deployment to 1000m (CTD-14) at 5° 8.17'S, 12° 11.71'W, 10:30-11:20z.

At 20:00z, rock-core station RC-17 (4° 48.65'S, 12° 22.65'W) was commenced. The corer reached 3054m at 20:59z and was recovered inboard at 22:05z. The ship was then repositioned for a further rock-core station but the sudden availability of the CTD-rosette again at 22:25z meant that the next rock-core station was postponed and the ship re-positioned for station CTD-15 at 4° 48.58'S, 12° 22.41'W. This station was commenced at 23:21z on JD 072 and reached a maximum water depth of 2975m at 00:25z on JD 073. The CTD-rosette was recovered in-board at 03:19z.

The next operations were a series of three closely spaced rock-core deployments. RC-18 (4° 47.78'S, 12° 22.53'W) was deployed at 05:28z, reached 3020m at 06:24z and was recovered at 07:25z. RC-19 (4° 48.04'S, 12° 22.60'W) was deployed at 07:44z, reached 3010m at 08:48z and was recovered in-board at 09:50z. RC-20 (4° 47.25'S, 12° 22.85'W) was deployed at 10:10z, reached 3094m at 11:11z and was recovered in-board at 12:11z.

Following these operations the ship was re-positioned ready for launch of dive ABE 153 and the USBL stem was lowered accordingly (13:23z). Prior to commencement of this ABE dive, however, station CTD-16 was occupied (4° 47.80'S, 12° 22.61'W). Deployment commenced at 14:25z, a maximum depth of 2991m was reached at 15:47z and the instrument was recovered inboard at 17:19z. After passing deck-tests, dive ABE 153 was successfully launched at 4° 48.08'S, 12° 22.76'W some 2.5 hours later, at 19:59z.

After confirming that ABE had descended safely to the seafloor and begun its survey as planned, the ship transited south for rock core station RC-21 at 4° 50.16'S, 12° 21.97'W. The corer was deployed at 21:30z, reached 3012m depth at 22:32z and was recovered in-board at 23:30z. The ship then returned north for dredge station DR-03. This dredge was initiated at 00:57z on JD 074 at 4° 46.35'S 12° 23.19'W. After deployment along the seabed from 02:02-03:16z the dredge was recovered in-board at 04:50z at 4° 47.45'S 12° 21.87'W. When all was secure transit was made to the ABE recovery site. Despite initial problems with communication with the vehicle confirmation was received that the vehicle was ascending through the water column at 10.50z. Dive ABE 153 was eventually completed at 13:55z when the vehicle was recovered in-board at 4° 49.80'S 12° 22.04'W.

Although it was intended that ABE should be re-deployed as soon as possible following dive ABE 153, the opportunity was taken to occupy a further CTD station (CTD 17, 4° 48.34'S, 12° 22.30'W) while ABE was being prepared for redeployment. CTD 17 was deployed at 14:45z, reached a maximum depth of 2952m at 16:04z and was recovered inboard at 17:46z. The ship then proceeded to the Dive ABE 154 deployment site, arriving on-station at 19:00z. Dive ABE 154 was initiated at 20:39z when the vehicle was released at 4° 48.63'S 12° 22.71'W.

After deployment the vehicle was monitored during descent to the seafloor and commencement of its pre-programmed survey and then, at 21:31, transit was made to our final dredge station. DR-04 was deployed at 21:56z at 4° 47.63'S 12° 22.69'W. The dredge was lowered to the seafloor and remained on-bottom from 23:29z on JD 074 to 01:10 on JD 075. It was recovered in-board at 4° 44.96'S, 12° 20.85'W at 02:45z on JD 075.

The final rock-sampling station of the cruise followed – rock-core RC 22 located at 4° 49.28'S 12° 21.89'W. The rock core was deployed at 03:35z, lowered to the seafloor at 2927m at 04:31z and recovered inboard at 05:28z. During lowering of the rock-core, confirmation was received from ABE that it had finished the mission for Dive ABE 153 and was returning to the surface. The ship arrived at the ABE recovery position at 06:00z, ABE surfaced at 06:33z and was recovered inboard at 4° 48.39'S, 12° 22.45'W at 06:51z on JD 075 approximately 10 hours after launching.

As soon as ABE was recovered, a final CTD station was occupied. CTD-18 (4° 48.61'S, 12° 22.39'W) was deployed at 07:12z, lowered to a maximum depth of 2959m at 08:20z and recovered in-board at 09:53z. Following rapid downloading of data and recharging of batteries, the ship then repositioned for final dive ABE 155. The ship arrived on-station, above the Red Lion vent-site, at 11:40z. There was a 60 minute delay in deployment to guard against ABE's camera over-heating and the vehicle was launched at 4° 48.02'S 12° 22.68'W at 12:51z.

Our penultimate over-the-side operation was a vertical cast of 4 stand-alone pumps (SAP02) at 4° 48.5'S, 12°22.3'W. Deployment started at 13:35z and concluded at 20:13z. Pump operations were conducted from 16:16-18:16z. Following recovery of the SAPs in-board the ship transited north for a third and final attempt at use of the BRIDGET vehicle. Tow-yo BGT-03 commenced at 21:40z on JD 075 at 4° 44.97'S 12° 24.44'W but had to be recovered inboard at 21:53 and the ship repositioned for re-deployment at 23:58z, JD 075, at 4° 45.77'S 12° 23.83'W. From 01:30-03:34z on JD 076, BRIDGET reportedly operated very successfully at the required depths, between 2700m and the seafloor detecting nephelometer and Eh anomalies and closing Niskin bottles upon demand. This performance sadly came too late to be of any benefit to the cruise and, further, none of the data displayed in real time was logged in a manner that could be accessed during the remainder of the cruise – although the data were subsequently recovered from the logging computer and restored to the PSO, post-cruise. At 04:53z, JD 076, BRIDGET was recovered in-board at 4° 48.55'S 12° 21.78'W having been tow-yo'ed directly across the 5°S MAR vent-sites.

At 05:55z ABE returned to the surface for the last time and transponder "B" was released at 05:56z. Dive ABE 155 was concluded at 06:22z when the vehicle was recovered in-board at 4° 48.30'S 12° 27.25'W. The remaining navigation transponders were released and recovered between 07:06z and 09:30z. At this time, science operations were broken off from 4° 49.71'S 12° 22.53'W and passage made direct to Ascension Island.

Leg 2 and, hence, the entire scientific operations of RRS *Charles Darwin* Cruise CD 169 were completed with the disembarkation of the scientific party by pilot boat at Ascension Island at 08:50z on JD 077.

The ship's track followed by RRS *Charles Darwin* during CD 169 is shown in Figure 1. A diary of events is given as Appendix A and Science Logs for Legs 1 & 2 are given as Appendices B & C.

(C.German)

SCIENTIFIC REPORTS

1. EM-12 Multi-beam Bathymetry.

1.a) Introduction

The Simrad EM-12 is a 13kHz multibeam echo sounding system, designed to operate in water depths from 50m to 11,000m (full ocean depth), using 81, 1.5° equidistant beams providing 120° coverage. The theoretical swath width in deep water recording mode is up to 7.4 times water depth, although this coverage is restricted by speed of advance of the ship, character of the seafloor and weather conditions. Typical value for the coverage during CD169 was approximately three times water depth.

The EM12 is composed of transducer arrays, a transmitter subsystem, a receiver subsystem, including beam-forming and special digital signal processors, a Bottom Detection Unit (BDU), and an Operator Unit (OPU) with external interfaces for data input and output on serial line and Ethernet. Also included are the Quality Assurance Unit (QAU) and Sonar Imaging Unit (SIU).

The transmit fan is split into several individual sectors with independent active steering according to vessel roll, pitch and yaw. This places all soundings on a "best fit" to a line perpendicular to the survey line. The sectors are frequency coded (12.7, 13.0 and 13.3kHz) to avoid interference (the outer beams have the lower frequency to optimise coverage). The steering is fully taken into account when the position and depth of each sounding is calculated, as is the refraction due to the sound speed profile, vessel attitude and installation angles. The ping rate is only limited by the round trip travel time in the water.

The transceiver unit uses a combination of phase and amplitude detection, resulting in measurement accuracy on the order of 50cm or 0.2% of depth RMS (whichever is greater), practically independent of beam pointing angle.

At the beginning of survey the BDU is configured with the relevant settings required, i.e. mode (deep or shallow), beam coverage and weather conditions, for example. The BDU determines the range to the bottom in every beam using data from the transceiver unit, and transfers the ranges to the OPU. The OPU, is the operator interface of the EM12, does the final conversion from beam ranges to position and depth on the seafloor, and interfaces with other systems in the ship, e.g. gyro, DGPS. The OPU also uses the sound velocity information to calculate the beam ranges into depths.

Both BDU and OPU are located in the ship's plot. From here it is possible to quality assure the data as it is acquired.

The Mermaid software, housed on the Mermaid UNIX workstation, also in the plot, is where the swath data is stored. Here the cruise identification, CD169, is logged and all acquired data transferred to that ID directory. The Mermaid UNIX workstation also houses the Merlin software. This allows visualisation of data acquisition, where if any loss of data should occur, adjustments could be made to the BDU/OPU settings. A Merlin slave display unit was also available in the main scientific laboratory for watch keepers to keep an eye on data quality.

The swath data is initially processed on the OPU and logged as a line number. These line numbers have to be manually incremented on the OPU, in order to assure no loss of data should the system fail. Upon line number change the raw data is automatically copied to the Mermaid system where it is stored.

1.b) Data acquisition and system performance

In order to acquire accurate swath data two operations may need to be performed. Firstly a sound velocity profile (SVP) is required in order that the OPU can accurately calculate true depths. Second it may be necessary to run a calibration survey, in order to check the roll and pitch bias.

The EM12 was activated soon after departure from Cape Verde, but due to the fact that for cruise CD169 swath data was not required until we reached our survey area, which was 6 days transit, we did not acquire a SVP, as this was intended to be done shortly before the swath survey commenced, or perform a calibration survey. However, once the system was logging and using the SVP installed, following cruise CD168, it was found that the quality of the data was good and did not merit a calibration check. Although with increasing distance from Cape Verde, some deterioration of the data could be seen as a result of not applying a SVP relevant to the region of transit.

Upon arrival at the start of the survey area, time constraints, due to a slower than expected transit, meant that no SVP was acquired. However SVP information taken from an Expendable Bathy Thermograph (XBT), acquired during a previous cruise to the region (JR65, 1991), was input to the OPU.

The Swath survey began at 17:37 on the 23rd February 2005 at 2° 55.98'S 12° 14.12'W.The intended use of the survey was to fill-in gaps in existing swath data and to locate a ridge axis where no swath data existed. This was necessary in order to produce a "road map" by which the TOBI (Towed Ocean Bottom Instrument) sidescan sonar instrument could be flown. Due to the time constraints generated by the slow transit, the swath survey was cut short. The survey ended at 10:04 on the 24th February 2005 at 5° 08.43'S 12° 18.39'W.

Data quality throughout was good with very little deterioration, other than some noise in the outer 5 to 10 beams on either side. The new data was processed and merged with the existing data (see later). This new data set was then used to generate bathymetry plots by which TOBI could be navigated during TOBI's first two deployments.

Due to the reduced swath survey area, the EM12 was also used during TOBI survey 03. This survey was to "fly" over a section of the ridge where our existing data had some data gaps. As the TOBI vehicle is towed up to 4km behind the ship, it was possible to print off a screen dump of the swath, which was several kms ahead of the TOBI vehicle and fill in the gaps on our printed swath plots. This data was again of good quality and processed to be merged with the existing data.

At the end of TOBI survey 03, just prior to our transit into Ascension, for a crew change, the ship lost all electrical power resulting in the EM12 shutting down. Once the ships power problems were rectified, the EM12 was re-started. However during the 19hr transit to Ascension, there were problems with the EM12 data, where a time error between the OPU time and DGPS input time occurred. All the raw data for this period is currently inaccessible for processing.

During the crew change at Ascension the EM12 was re-booted. This involved the powering down of the system. Upon re-start the time problem had seemingly been rectified and logging was again resumed.

EM12 data was acquired during the transit out to the designated working area, approximately 200M north of Ascension, for CD169, leg2. Although no specific swath surveying was required during leg 2, wherever possible the EM12 was left on to acquire data in an ad-hoc fashion. This proved to be valuable in that during transit from one station to another additional data could be added to that which previously existed.

Also during leg 2, where time allowed between other instrumentation down times, swath data was acquired along the flanks of part of the ridge section that had never been swathed, prior to leg 1. This allowed an increased understanding of the regional setting of the survey area where all work during leg 2 occurred. (It was necessary to set the transmit mode of the EM12 to "off" when close to the ABE survey areas, as the 13kHz frequency of the EM12 affected their transponder signals. This resulted in the EM12 being switched on and off frequently and for varying periods of time.)

During one of the ad-hoc ridge flank surveys, the problem, which occurred after the power loss, recurred. This resulted in abandoning the survey. It was established that the clock on the OPU was 7min different to that on the DGPS. Once the problem was identified it was simply a case of manually setting the time on the OPU to tie-in with the DGPS input signal. (The error manifested itself by displaying the message "Time dif -378570 millisec between pos and ping to big" on the Merlin consol as well as there being no data visual on the Merlin window.)

A total of 85 swath lines were logged and processed (line numbers not incremented by any fixed time period). Of these 85 lines 17 were not available due to the OPU time problems (a total of 21hrs worth of swath data).

A full list of swath survey data is logged at Appendix D.

(A.Evans)

2. TOBI Operations.

The Towed Ocean Bottom Instrument (TOBI) deep tow vehicle was deployed and recovered three times during CD169, between1030z (JD 055) – 0811z (JD 057), 1314z (JD 058) – 1825 (JD 059), and 0814 (JD060) – 1405 (JD062).

The proposed survey plan was to use the EM12 multibeam bathymetry data acquired during the earliest part of the cruise to design the acquisition of two parallel, marginally overlapping sonar swaths, occupying reciprocal tracks through the axial valley of a least four of the second order ridge segments closest to the Ascension Fracture Zone. Due to time constraints, however, only a single pass was made, covering a six-kilometre swath central to the axis. Approximately 2700 square kilometres of ridge axis were insonified producing high quality images of extensive fresh-looking sheet flow packages and more MAR-typical, constructional volcanic ridges. Heavily sedimented, broad non-transform discontinuities linking the segments appear to host localised volcanic activity in intermediate 'relay' pull-apart basins.

Additional instrumentation carried by TOBI also produced key results for the cruise. A nephelometer on the vehicle forming part of the hydrothermal particulate monitoring suite (see Science Report 5 on MAPRs, below), confirmed in real time the presence of hydrothermal plumes at a number of sites within the segments studied. Phase difference sonar data were continuously collected for post-cuise processing into interferometric bathymetry. Finally, chirp seismic profiler and three component magnetometer data acquired will constrain high resolution topographic and magnetic field variations, respectively, for comparison with ABE AUV data in the focus study area (see Science Report 6, below).

It is worth noting that the complementarity of the imagery acquired using the 30kHz TOBI sidescan and both the SMS2000 multibeam and 675 kHz scanning altimeter on ABE produced a very powerful integrated dataset for analysis of neovolcanism and neotectonic processes at mid-ocean ridge systems.

(I.Rouse, L.Parson)

3. BRIDGET Operations.

The BRIDGET deep-tow system is a deep-tow CTD+sensor unit for the identification, investigation and sampling of hydrothermal plumes. The instrument was a joint development, under the NERC's BRIDGE programme, between the University of Cambridge and the former Institute of Oceanographic Sciences Deacon Laboratory (1993-1995). In 2001, BRIDGET was formally transferred into UKORS ownership to become part of the National Marine Equipment Pool.

The BRIDGET deep-tow carries the following sensors and samplers:

- FSI Micro CTD Ser. No. 1327 (BRIDGET CTD)
- FSI Micro CTD Ser. No. 1359 (TOBI CTD borrowed as a spare)
- Chelsea Instruments Alphatracka Transmissometer 25 cm. pathlength.
- Chelsea Instruments Aquatracka nephelometer.
- SeaTech Light Scattering Sensor (LSS)
- General Oceanics 12 position rosette pylon (modified) equipped with 12 x 2.5 litre Niskin bottles.
- Simrad Mesotech Acoustic Altimeter (500 metre range).
- Dual clinometer attitude sensor and flux gate magnetometer compass unit

For the second cruise running (following CD128 to the Central Indian Ridge in 2001) this was not a happy cruise for BRIDGET. A major limitation for most of the cruise was that there were significant teething problems with the new version of software that had been developed to interface the vehicle subsequent to transfer into UKORS. As the very final operation of the cruise, however, a successful CTD tow-yo was completed and, although the stored data could not be accessed at sea, real-time success was apparent during the cast, as projected onto the controlling computer's display scheme and the recorded data was successfully recovered from the relevant hard-drive post cruise. After some years in the wilderness, it is to be hoped that BRIDGET will once again be ready to serve again as an international state-of-the-art survey vehicle in years to come.

(C.German, D.White)

4. CTD operations

4.a) CTD sensor configuration

CTD configurations and calibration factors are listed in Appendix E reflecting changes as they occurred during the course of the cruise. Main system sensors are given in Table 4.1. In addition to those listed below an experimental E_h sensor was deployed for all casts, physically attached to the stabilising fin and giving direct, voltage, readout to Voltage channel 5 (V5), while external Mn and Fe sensors were attached to the frame on an occasional basis. These latter sensors did not contribute to the Sea Bird data stream.

SENSOR / SYSTEM TYPE	SERIAL No	REMARKS
Sbe 9+ CTD	09p-1987-0528	Main ctd, 24 way st st frame
Digiquartz pressure sensor	73299	
Sbe 03p temperature sensor	03p-4489	primary
Sbe 03p temperature sensor	03p-4490	secondary
Sbe 04c conductivity sensor	04c-3052	primary
Sbe 04c conductivity sensor	04c-3054	secondary
Breakout box	B019109T	
Sbe 5T pump	2793	primary
Sbe 5T pump	3607	secondary
Sbe dissolved oxygen	43-0709	
Sbe 32 carousel	32-19817-0243	
Deck unit	11p34173-0676	spare
Deck unit	11p23680-0587	Main unit
BBRTD scattering meter	169	
Transmissometer	161/2642/002	
Fluorometer	88/2360/108	
seapoint OBS	10491	

Table 4.1 : CTD main system sensors

4.b) CTD Deployments

22 individual CTD casts were conducted during the course of the cruise. Of these, 5 were test casts to 500 or 1000 meters to test system performance after faults developed (see later in text) or to fill the Niskin bottles with water from depth to leach contaminants. Two casts, casts 012 and 013, were aborted at 70 metres and 30 metres respectively and are not included in cast records but do influence the total cast number.

The arrangement of sensors differed during the CTD programme in an attempt to rectify performance issues. These changes are given in Table 4.2; configuration files with relevant changes are included in Appendix D.

CTD cast logging was always begun on deck. The instrument package was lowered into the water with minimal pause at the surface, taken to 3 meters and held there for 5 minutes. This was to allow the Mn, and Fe (if present), sensors to prime their pumps, and to allow the Sea Bird T/C pumps to start and stabilise readings. Following this wait the package was lowered directly to a predetermined depth calculated to be approximately 50 meters above the seafloor. At this point a decision was made to continue the downcast depending on the output of the Beam Transmission, Optical Backscatter Sensors and Eh sensor (V5) as indicators of hydrothermal plumes in that vicinity. Bottle firing sequences were decided at the lowest point of the cast on the basis of this

same information but including any temperature anomaly information if observed. If conditions were appropriate and indicated the close proximity of fresh vent fluids, for instance the presence of a buoyant plume or temperature anomaly, the instrument package was "Tow-yo'd" up and down through the plume for more comprehensive sampling.

Station Number	Cast Number	System Changes
Test 2	005	Seapoint OBS removed for this cast
006	008	Deck Unit and Logging computers swapped. New *.con file in accordance.
010	014	Seapoint OBS to V3, Fluorometer to V4, BBRTD to 2. New *.con file in accordance.

Table 4.2: CTD configuration changes

4.c) CTD Performance

The CTD system suffered a number of problems during the course of the cruise. In retrospect these may be related to the same cause though, at the time, they manifested themselves in such a way that other causes were indicated.

Issues first arose on cast 004 (Station 003) when, at the end of the downcast, the Deck Unit registered an error, the modem link to the SBE 32 carousel was lost and bottles could not be fired either via software or manually. The unit was examined on deck and no problems could be found after cycling the power. A test dip was conducted, cast 005 (station "Test 2") to 500 metres and all bottles were fired successfully though modulo error counts, indicating communication errors, were higher than expected. It was decided to continue the CTD programme and cast 006 (Stn. 004) was successful in all respects. The problems recurred on cast 007 (Stn. 005) when on start up the Deck Unit failed to initiate until the third attempt. Logging computers were extremely unstable with a propensity to hang at the NMEA (GPS) acquisition stage and the main overlay display was not responding. Attempts to refresh the display caused the software to crash. This first occurred at 50 metres and the instruments were brought to the surface and restarted. The second occurrence was at 100m and the system was reset and the downcast was continued from there. Upon firing the first bottle the software running on the data collection computers once more crashed. Subsequent attempts to fire a bottle via software also cause the same effect and the Deck Unit modem status light was out. Attempts to fire the bottles manually from the Deck Unit were unsuccessful. The Deck Unit was left running and the package brought to the surface with no water samples being taken. Upcast instrument data was still logged under the new name of cast 005A on the backup computer only. Further investigation on deck indicated modem communication problems and the Deck Unit was replaced with the spare unit (s/n 11p34173-0676). Data logging computers were also swapped at this point as the Sea Bird software, during modem communication periods, seemed more stable on the Windows 2000 operating system than under Windows XP. Continued tests of the rosette firing mechanism indicated difficulty firing some positions on a regular basis. The trigger mechanism was removed and thoroughly cleaned. This appeared to fix the problem.

Problems next arose in the set up for casts 012 and 013 when the Deck Unit failed to start up completely when powered on. Over the course of these two casts various remedies were applied to what was a very intermittent problem but which appeared, at least in part, temperature related. Sometimes the system would appear to be stable only to crash an hour later. A new pigtail was attached to the CTD wire termination, the sea cable extension to the SBE9+ was replaced, cables to the temperature and conductivity probes were replaced and the breakout box was opened and inspected for leaks. A test cast to 1000 metres was conducted successfully and once more the CTD programme was resumed. The system failed again on the set up for the next cast. The SBE9+ unit

was removed at this point since metering of the auxiliary channel power supply pins indicated that the unit was not supplying power to the outboard sensors. On inspection of the power board two screws that hold a large heat sink onto the bottom of the power switching unit were found to be loose and in intermittent contact with the modem board directly below them. Additionally a power output regulation transistor was found to be faulty. These issues were rectified and stable power was stored to the unit. Some contacts on the power supply board were re-soldered at the same time. The unit was reassembled and secured back into the frame. All subsequent casts were conducted without incident.

4.d) Data Processing

Data for each cast (upcast and downcast) was first converted from the raw data file to ASCII using the SBE Data Processing software under the following configuration;

Depth (sea water, m) Pressure (digiquartz) Voltage 4 Beam Transmission User Polynomial (BBRTD) Temperature 1 (ITS-90, Deg C) Temperature 2 (ITS-90, Deg C) Potential Temperature (ITS-90, Deg C) Conductivity 1 (mS/cm) Conductivity 2 (mS/cm) Density (kg/m3) Salinity (PSU) Voltage 5 Voltage 3

Subsequently this converted data was corrected for conductivity cell thermal mass effects within the same suite of software running the sub routine Cell Thermal Mass configured as follows: Thermal anomaly amplitude (alpha) = 0.03Thermal anomaly time constant (1/beta) = 7 (for both primary and secondary temperature sensors).

On completion the data was corrected for heave and roll fluctuations using the Loop Edit subroutine. Casts 001 to 011 were compensated for loops below 0.25 metres per second (15 m/min) and Casts 014 to 018 were compensated for loops less than 0.10 metres per second (6 m/min) since these casts involved slow up and down casts above the plume site.

All converted files after and including the cell thermal mass correction procedures were then averaged over 10 second time intervals.

(P.Keen)

5. Miniature Autonomous Plume Recorders (MAPRs)

Six MAPR units were provided for cruise CD169 from Dr Ed Baker, NOAA-PMEL in the USA. These MAPRs were deployed extensively throughout both legs of the cruise - 40 stations in total. On the first leg all 6 MAPRs were deployed for each of TOBI runs 1 to 3. Two sensors were deployed at heights of 1 m and 50 m above the depressor weight and the remaining 4 were

suspended from a wire that hung directly below the depressor weight with instruments deployed at 50, 100, 150 and 200 m below the depressor.

All Rockchip stations (1-22) were run with a MAPR 20 m above the rock chipper.

A MAPR was attached to the CTD frame on CTD stations 6, 8, 9, 11, 15, 16, 17 and 18 as a fallback for the unreliable optical backscatter sensor on the CTD (see earlier).

On all dredge stations (1-4) a MAPR was attached to the wire 10 m above the pinger.

On the deep undulating MAPR station (DUM1), 6 MAPRs were attached at an equal spacing of 50 m to the wire, weighted down by a bottom weight. The string was then towed behind the ship at different depths to search for plume signals.

On the Stand Alone Pump stations SAPS 1 and 2 four MAPRs were attached on the wire at the same depth as each of the pumps.

The data for all MAPR deployments were recovered successfully. Only a part of the downcast for station CTD 11 was missed, due to a programming error.

(R. Prien)

6. ABE (Autonomous Benthic Explorer)

6.a) Overview

The ABE vehicle from WHOI (USA) was used extensively during Leg 2 of cruise CD169 in three modes -i) to map non-buoyant hydrothermal plumes; ii) to conduct detailed swath mapping of the seafloor and intercept buoyant hydrothermal plumes; iii) to investigate and photograph new hydrothermal fields on the deep seafloor. During the course of the cruise, 5 ABE dives were conducted ABE 150 to ABE 155 – one Phase I, two Phase II, one partially failed Phase III (sensors operational but no photographs recorded), and two further Phase III dives.

6.b) ABE Dive 150.

ABE150 was a phase 1 dive. The dive tracks were based on clues obtained from an earlier TOBI tow on leg 1 of this cruise. The depths were refined before the ABE dive from CTDs and the tow of an array of MAPRs (DUM-1). The dive was very successful, we found E_h and OBS (optical back-scatter) anomalies at two different depths nearly at the center of the survey grid.

These data did not constrain the search nearly as well as the MAPR data from our past experience with AEB in the Lau Basin so we had to cover a larger area and use significantly larger track spacings (1km for ABE150 versus 200m on the phase 1 Lau dives).

The dive tracks made up a grid with lines 4.5km long spaced at 1 km. The dive started at a spot about 2 km away, the start point was chosen based on considerations of total water depth, LBL (long base-line) net coverage, and terrain. The inefficiency of the long connector leg was accepted since the chosen starting spot reduced some uncertainty for the first dive. Tracklines alternated depths between 2750 m and 2875 m depth.

The 3 element LBL worked very well and coverage was solid - only one flyer was crunched for the entire dive. The vehicle DR'd (dead reckoned) when expected based on maximum transponder range (set to 7 seconds, changed to 8 after testing it during the abort phase of this dive).

The DVL (Doppler velocity log) performed well also. It maintained bottom-lock out to ranges of up to 250 meters (the maximum setting). Mike Jakuba noticed some strange segments when it lost bottom lock and water track simultaneously.

Summary: ABE150 Start time: 2005/03/08 16:27:19 Survey start: 2005/03/08 19:16:15 Survey end: 2005/03/09 20:04:53 Surface time: 2005/03/09 23:38:33 Recovery time: 2005/03/10 00:33:39 descent: 0.23 kwhr over 2.81 hrs, ave pwr: 80.1 w survey: 4.65 kwhr over 24.80 hrs, ave pwr: 187.4 w over 43.3km 2810 m depth ascent: 0.13 kwhr over 4.72 hrs, ave pwr: 28.1 w surface: 0.05 kwhr over 0.92 hrs, ave pwr: 49.8 w Total energy use: 5.01 kwhr Min cell voltages 2: 3.65 3.67 3.66 3.67 3.65 3.67 3.65 3.66 3.65 3.66 3.64 3.67 3.65 3.66 3: 3.65 3.65 3.64 3.66 3.65 3.67 3.66 3.67 3.65 3.67 3.64 3.66 3.63 3.66 energy from pack 1: 1.660 2: 1.675 3: 1.673 kwhrs

ABE150 DVL stats 119125 pings over 24.7 hour survey beam 1, 82.4 pct max range: 240.4 beam 2, 82.9 pct max range: 240.4 beam 3, 79.9 pct max range: 240.4 beam 4, 83.1 pct max range: 240.4 0 beams 15.4 pct 1 beams 1.0 pct 2 beams 0.8 pct 3 beams 5.9 pct 4 beams 77.0 pct average ping rate: 1.34 pings/sec Mean speeds u: -0.405 v: 0.004 w: -0.022

6.c) ABE Dive 151

ABE151 was a phase 2 dive based on the data from ABE150, CTD, and MAPR data. Tracklines, each 600m long, ran ENE-WSW with 30 meter spacing at 50 meters height. We ran the SM2000 for bathymetry along with the Imagenex (the latter data were not very useful, ABE altitude too high). The dive identified two vent sites. On the first few lines at the southern end of the survey, the data showed a vent site with temperature rises of about 150 mdeg and OBS hits of just over 100 mV. At the northern end we saw solid temperature hits (200 mdeg increase) and an OBS signal over 100 mV lasting for over a minute on the last trackline.

Our choice of the survey area was critical for the success of this dive, as the vent signals were seen on the first and last lines only.

The vehicle performed well, LBL and DVL nav were excellent. The dive ended when the end-ofmission time was reached, although low battery warnings were being generated on every climb and descent and it probably would not have made it more than a few minutes more. Summary: ABE151 Start time: 2005/03/10 18:45:06 Survey start: 2005/03/10 21:24:39 Survey end: 2005/03/11 12:49:18 Surface time: 2005/03/11 16:35:21 Recovery time: 2005/03/11 16:55:22 descent: 0.42 kwhr over 2.65 hrs, ave pwr: 157.4 w survey: 4.71 kwhr over 15.40 hrs, ave pwr: 305.8 w over 35.2km 2930 m depth ascent: 0.21 kwhr over 4.28 hrs, ave pwr: 48.0 w surface: 0.02 kwhr over 0.33 hrs, ave pwr: 57.5 w Total energy use: 5.33 kwhr Min cell voltages 1: 3.58 3.52 3.58 3.60 3.58 3.59 3.59 3.59 3.59 3.58 3.60 3.57 3.61 3.58 3.62 2: 3.59 3.61 3.60 3.60 3.61 3.61 3.58 3.62 3.57 3.60 3.58 3.60 3.60 3.61 3: 3.59 3.59 3.57 3.60 3.60 3.61 3.61 3.61 3.58 3.61 3.59 3.60 3.56 3.60 energy from pack 1: 1.778 2: 1.781 3: 1.776 kwhrs

ABE151 DVL stats 89804 pings over 15.3 hour survey beam 1, 100.0 pct max range: 237.7 beam 2, 100.0 pct max range: 240.4 beam 3, 100.0 pct max range: 219.0 beam 4, 100.0 pct max range: 240.4 0 beams 0.0 pct 1 beams 0.0 pct 2 beams 0.0 pct 3 beams 0.0 pct 4 beams 100.0 pct average ping rate: 1.63 pings/sec Mean speeds u: -0.626 v: -0.001 w: -0.016

6.d) ABE Dive 152

Close, but no cigar. ABE flew great tracklines at 5 meters height through the vent field. The survey track started with a large box (250 x 200) then two 100 meter boxes over the spot determined by the adaptive algorithm. Track spacing was 5 meters. All went very well except that the camera failed after about 100 bottom images. All other data were good, including the SOC manganese sensor (see Science Report 7).

LBL tracking and bottom following worked very well. The vehicle hit bottom a few times, including once when it hung up for 9 minutes, but it timed out and freed itself. Vehicle came up with one very strong burn mark on the stbd pod fwd and some muck on the nose. In the case of the big hangup, none of the ranging devices (fwd looking Robertson at 60 deg up, DVL, Imagenex) saw the obstacle coming.

OBS, temperature and E_h data look great. The E_h data clearly outline the smoker field in the NW corner (identified by the IPT algorithm) and a lower temperature area (diffuse flow?) in the southeast quadrant.

Summary: ABE 152 Start time: 2005/03/12 12:42:47 Survey start: 2005/03/12 15:16:16 Survey end: 2005/03/13 03:04:51 Surface time: 2005/03/13 05:49:32 Recovery time: 2005/03/13 06:12:05 descent: 0.35 kwhr over 2.55 hrs, ave pwr: 137.3 w survey: 2.22 kwhr over 11.80 hrs, ave pwr: 188.0 w over 17.0km 2967 m depth ascent: 0.20 kwhr over 3.36 hrs, ave pwr: 58.9 w surface: 0.03 kwhr over 0.38 hrs, ave pwr: 75.0 w Total energy use: 2.77 kwhr Min cell voltages 1: 3.74 3.64 3.74 3.75 3.74 3.75 3.74 3.75 3.74 3.75 3.75 3.75 3.75 3.76 2: 3.75 3.76 3.75 3.76 3.75 3.77 3.74 3.76 3.74 3.76 3.74 3.75 3.74 3.76 3: 3.74 3.75 3.73 3.75 3.75 3.75 3.74 3.75 3.74 3.76 3.74 3.76 3.73 3.75 3.74 energy from pack 1: 0.959 2: 0.957 3: 0.953 kwhrs

ABE152 DVL stats 147431 pings over 11.8 hour survey beam 1, 99.9 pct max range: 240.4 beam 2, 99.8 pct max range: 240.4 beam 3, 99.7 pct max range: 240.4 beam 4, 99.5 pct max range: 240.4 0 beams 0.0 pct 1 beams 0.0 pct 2 beams 0.0 pct 3 beams 1.1 pct 4 beams 98.9 pct average ping rate: 3.48 pings/sec Mean speeds u: -0.379 v: 0.002 w: -0.004

6.e) ABE Dive 153

ABE153 was a phase 2 dive. We had planned a phase 3 dive, but the failure of the camera on deck made us change plans. In hindsight, the failure on deck was a blessing since the camera had a major problem, a short in the oil-filled cable. This had caused the problem on dive 152, but we danced (frantically) around the problem (more in another document). We had the camera working fine on the bench, but not with the full vehicle cabling. So the camera setup we were about to launch for the phase 3 version of 153 was doomed to failure. We removed the camera and computer and ran a phase 2 (no sm2000, since the same computer runs both the sm2000 and the camera). Camera repairs continued while the vehicle ran the phase 2 ABE153 survey.

The tracklines for ABE153 consisted of a 600x600 m block north of the area surveyed in ABE151 with EW lines, then long lines running NS to the east expanding the 151 survey. Since we were relying on the imagenex for bathy, we ran at 40m height with 25m spaced lines.

The tracklines north of the ABE151 lines closed the vent field that we spotted on the northernmost line of ABE151. On ABE153, this field showed OBS hits on the order of 200 mV and temperature increases of about 200 mdeg (similar to the hits seen on ABE151). The 4 lines run expanding the 151 survey area to the east did not show any large excursions of temperature or OBS.

The dive ended with an abort command issued from the surface, since the camera was now working and we decided to start the next camera dive as soon as possible. We tried at about 0600 with no success. Al's theory, verified by the data, was that the replacement thruster was noisy and prevented the 10.5 interrogations from being received at the vehicle. I (DY) kept trying throughout

the morning. On a northbound line whenever I noticed a few 13.0 responses I switched the ducer to the command box and sent some codes. I did this a few times, finally getting through. The data showed that when the code was received, the vehicle was hill climbing and had slowed its aft thrusters (including the noisy one). After the thrusters shut down, reception of the 10.5 interrogations was very consistent, as opposed to nearly zero when they were running.

Summary: ABE 153 Start time: 2005/03/14 18:52:21 Survey start: 2005/03/14 22:31:37 Survey end: 2005/03/15 10:39:00 Surface time: 2005/03/15 13:24:14 Recovery time: 2005/03/15 13:47:17 descent: 0.26 kwhr over 3.65 hrs, ave pwr: 72.6 w survey: 3.09 kwhr over 12.12 hrs, ave pwr: 255.1 w over 26.1km 2990 m depth ascent: 0.07 kwhr over 3.31 hrs, ave pwr: 21.3 w surface: 0.01 kwhr over 0.38 hrs, ave pwr: 34.8 w Total energy use: 3.43 kwhr Min cell voltages 1: 3.67 3.61 3.67 3.70 3.67 3.68 3.68 3.69 3.66 3.70 3.68 3.70 3.68 3.70 2: 3.69 3.70 3.69 3.69 3.69 3.71 3.68 3.70 3.68 3.69 3.67 3.70 3.67 3.70 3: 3.68 3.69 3.68 3.70 3.69 3.69 3.69 3.70 3.68 3.70 3.67 3.69 3.67 3.69 energy from pack 1: 1.141 2: 1.146 3: 1.144 kwhrs ABE 153 DVL stats 80268 pings over 12.0 hour survey beam 1, 100.0 pct max range: 226.1 beam 2, 100.0 pct max range: 240.5 beam 3, 100.0 pct max range: 288.6 beam 4, 99.9 pct max range: 253.3 0 beams 0.0 pct 1 beams 0.0 pct 2 beams 0.0 pct 3 beams 0.2 pct 4 beams 99.8 pct average ping rate: 1.86 pings/sec

6.f) ABE Dive 154

Mean speeds u: -0.586 v: 0.002 w: -0.009

ABE 154 was a phase 3 dive (close up survey including camera) at the southern of the two vent sites. It was a short run to get essential data and to make sure all was well with the camera. The vehicle ran a 5m-spaced block over the site identified by the adaptive algorithm on ABE152 with lines 80m long. Then it ran a 100m x 100m block over a presumed diffuse vent field to the southeast.

The vehicle and camera system performed well. LBL navigation worked fine and most fixes used all 3 transponders. The DVL performed well also, although the output was not used in realtime. Bottom-following worked very well. We had made a few changes after the crashes on ABE152. We lowered the forward looking sonar from 30 degrees down to 45 degrees down and changed how that data was weighted in the bottom following algorithm. This time the vehicle did not hit the structures, although in looking at the pictures there were a few close calls. The vehicle made

several passes over structures on the order of 5 m tall without incident and it flew through clouds of black smoke on several occasions.

The bottom-following was set to 5m, and the vehicle held this pretty well even when flying up over the structures. Another change made after the crashes on 152 was to make the vehicle less aggressive when flying down.

Summary: ABE 154 Start time: 2005/03/15 20:30:19 Survey start: 2005/03/15 23:06:01 Survey end: 2005/03/16 03:40:12 Surface time: 2005/03/16 06:30:21 Recovery time: 2005/03/16 06:47:22 descent: 0.33 kwhr over 2.59 hrs, ave pwr: 129.4 w survey: 0.85 kwhr over 4.57 hrs, ave pwr: 186.0 w over 5.7km 2968 m depth ascent: 0.16 kwhr over 3.26 hrs, ave pwr: 49.8 w surface: 0.02 kwhr over 0.28 hrs, ave pwr: 60.4 w Total energy use: 1.35 kwhr Min cell voltages 1: 3.81 3.70 3.81 3.81 3.80 3.81 3.79 3.81 3.81 3.82 3.80 3.81 3.80 3.83 2: 3.81 3.83 3.81 3.82 3.82 3.83 3.80 3.81 3.79 3.82 3.80 3.82 3.81 3.82 3: 3.80 3.81 3.79 3.80 3.81 3.82 3.80 3.80 3.80 3.82 3.78 3.81 3.78 3.80 energy from pack 1: 0.457 2: 0.448 3: 0.445 kwhrs ABE 154 DVL stats 31327 pings over 4.6 hour survey beam 1, 99.9 pct max range: 288.6 beam 2, 99.8 pct max range: 288.6 beam 3, 99.6 pct max range: 288.6 beam 4, 99.6 pct max range: 288.6 0 beams 0.0 pct

1 beams 0.0 pct 2 beams 0.1 pct 3 beams 0.8 pct 4 beams 99.1 pct average ping rate: 1.90 pings/sec Mean speeds u: -0.353 v: 0.009 w: -0.00

6.f) ABE Dive 155

ABE155 was a longer photo run over the northern vent site 4° 47.84'S 12° 22.65'W). We planned a long, complex mission involving visits to several other sites after completing an adaptive survey on the main site. But the vehicle ran slower than expected and the abort time occurred at the end of the first adaptive survey.

The vehicle made a reasonable survey of the site, but the LBL navigation was poor. A number of factors contributed to the low quality: a) the vehicle was moving very slowly with strong current; b) the survey area was directly on the BD transponder baseline, so if A was not received a fix could not be computed; c) transponder B showed clear clipping by terrain - only at the closest (eastern) end of the survey could the vehicle hear B; d) transponder A showed some unexplained directional effect, the vehicle did not hear it well when driving away; e) the returns from D were a bit ratty. These results are in contrast to the other vent site to the south, where the acoustic tracking was nearly perfect.

We have been having trouble with our doppler velocity log (DVL), so we did not have it connected into the vehicle's navigation processing in real time. The problems now seem fixed, but we were shy to use it in real time given the quality of our previous LBL results. With the benefit of hindsight, that decision was clearly wrong: the DVL works fine and would have helped enormously in this case.

The dive achieved some very good results despite the LBL problems and slow/incomplete progress of the programmed survey. The adaptive algorithm properly identified the best site, and the vehicle returned there for more survey lines at a different orientation. The strongest plume hits and best photos were obtained during the adaptive survey. We made a quick mosaic of one of the approaches to the large structures, and it looks good.

Summary: ABE 155 Start time: 2005/03/16 12:42:12 Survey start: 2005/03/16 15:30:36 Survey end: 2005/03/17 03:01:43 Surface time: 2005/03/17 05:53:30 Recovery time: 2005/03/17 06:22:03 descent: 0.41 kwhr over 2.80 hrs, ave pwr: 147.1 w survey: 1.93 kwhr over 11.51 hrs, ave pwr: 167.2 w over 12.0km 3029 m depth ascent: 0.19 kwhr over 3.52 hrs, ave pwr: 54.1 w surface: 0.05 kwhr over 0.48 hrs, ave pwr: 96.0 w Total energy use: 2.53 kwhr Min cell voltages 1: 3.76 3.65 3.76 3.77 3.75 3.77 3.75 3.77 3.76 3.77 3.75 3.77 3.76 3.78 2: 3.77 3.78 3.76 3.78 3.77 3.78 3.75 3.77 3.75 3.77 3.75 3.77 3.76 3.77 3: 3.76 3.76 3.75 3.77 3.77 3.77 3.76 3.77 3.75 3.77 3.75 3.76 3.74 3.76 energy from pack 1: 0.846 2: 0.844 3: 0.842 kwhrs

ABE 155 DVL stats 141840 pings over 11.5 hour survey beam 1, 99.9 pct max range: 288.6 beam 2, 99.8 pct max range: 287.0 beam 3, 99.9 pct max range: 288.6 beam 4, 98.8 pct max range: 288.6 0 beams 0.0 pct 1 beams 0.0 pct 2 beams 0.0 pct 3 beams 1.6 pct 4 beams 98.4 pct average ping rate: 3.42 pings/sec Mean speeds u: -0.314 v: 0.000 w: -0.003

(D.Yoerger, A.Bradley, M.Jakuba, A.Billings)

7. In situ Chemical Sensors

7.a) E_h sensors.

In addition to the E_h sensor mounted on the ABE vehicle, two further E_h sensors were provided by Dr Koichi Nakamura (Japan). These sensors were deployed, one on the CTD, and one on the BRIDGET deep-tow vehicle. Both sensors worked reliably on all deployments (all CTD stations and BRIDGET tow-yo 3) without any failures. Drops in the output signal of the E_h sensor routinely coincided with signals in other parameters (optical backscatter, temperature anomalies, in situ Mn/FeII)

7.b) In situ Fe and Mn analysers.

Two *in situ* analysers were deployed on this cruise. Both analysers can be set up as manganese or iron II analysers by changing the reagents and standards accordingly. Both analysers were installed on the CTD frame for 2 CTD casts. On the first cast both analysers showed inconclusive results with a high noise on the baseline and no discernible effect of standard and blank when these were switched on instead of the sample input. After an adjustment of pump parameters both analysers showed a more stable baseline and easily identifiable steps when switching to blank or standard. For the following CTD deployments (CTD 15-18) the analyser worked without failure, apart from a problem with the internal flash memory card on CTD 18, leading to the loss of in situ Mn data for the first hour of measurements on CTD 18.

On ABE dives 150 to 152 the analyser installed on the vehicle was set up to measure Mn, all deployments were successful. On ABE dives 153 & 154 the analyser was set up to measure Fe II. These deployments also were successful.

On dive 150 the internal data logging of ABE did not record the Mn analyser data and they had to be recovered from the internal flash memory of the analyser's electronics. All dives yielded data sets that showed Mn and Fe II signals coinciding with other sensors on board ABE (optical backscatter, E_h , temperature anomalies).

The second analyser was deployed on CTD stations 3, 5 and 15 to 18 and on BRIDGET run 3, set up for the measurement of manganese in all cases. For CTD stations 3 and 5 on the first leg, the first analyser (later installed on ABE) was also run on the CTD, set up for Fe II.

(R.Prien, D.Connelly)

8. Hydrothermal Plume Water-Column Sampling

8.a) Sampling for total dissolvable metals, methane and nutrients

A total of 13 CTD casts were made. Samples from all casts were taken for total dissolvable metals (Mn, Fe) and methane. Half of the methane samples were collected for shipboard analysis and half for storage for analysis back at SOC. Nutrient samples were collected from those CTD casts that showed strongest evidence of hydrothermal impact. In addition to the CTD casts, 2 sets of samples were collected using the sampling rosette on BRIDGET, for a total of 15 samples.

CTD 16 was collected in the buoyant portion of a hydrothermal plume and so extra samples were collected for all analytes.

Methane samples were collected immediately the CTD arrived back on deck. In general, duplicate samples were collected into 100 ml borosilicate glass bottles, preserved with 100ml of mercuric chloride and crimp sealed with Teflon lined caps.

TDMn/Fe samples were collected into acid cleaned 1 litre LDPE bottles and acidified in the clean laboratory with 1ml of quartz distilled concentrated nitric acid. The samples are double bagged and packed.

Nutrient samples were collected into 30ml polycarbonate bottles and frozen.

Due to unforeseen problems with the standards for the GC, samples were not analysed on board for methane. Initial runs on the GC showed that there was methane in the samples that had a high nephel reading but the decision was made to save all of the samples and collect a better data set back at SOC.

CTD #	Metals	Nutrient	Methane	Other
1	15		48	
2	12		24	
3	Failed			
4	12		24	Labelled CTD3!!!
6	12		24	
7	8		16	
8	6		15	
9	6		12	
10	12	12	24	
11	11	11	24	
12	Failed			
13	Failed			
14	Failed			
15	15	14	30	
16	48 (24*2)	24	96	Buoyant Plume!
17	7	7	14	-
18	14	14	28	
BGT01	5		10	
BGT02	10			
Totals	204	82	389	

Table 8.1: numbers of water column samples taken for shore analyses.

(D.Connelly)

8.b) Filtration of Niskin Samples

Selected samples from CTD-rosette Niskin bottles were filtered through $0.4\mu m$ cyclopore membrane filters as soon as the bottles were brought on deck. The volume of seawater filtered was recorded and the membrane filters retained.

From CTD 3, a background station, 6 samples were filtered. From CTDs 6 - 11 and from CTD 15, a total of 50 samples (500 - 1500mL) were filtered. These samples all came from the non buoyant plume, as revealed by optical sensors on the CTD: an increase in nephelometry and/or a decrease in transmissometer reading.

CTD 16 collected 18 samples in the buoyant plume and all the remaining water in the Niskin bottle (approx 6000mL) after methane, TDMn/TDFe and nutrient samples had been taken was filtered. These filter membranes were observed to have black/brown precipitate present. Above the buoyant plume 2 background samples and 4 non-buoyant plume samples were filtered (1000mL each).

CTDs 17 and 18 collected 5 samples from the edge of a buoyant plume and in each case all the remaining water in the Niskin bottle was filtered, as before (approx 7000mL). There were no non-buoyant plume samples from these CTD casts.

(S.Bennett)

8.c) Stand Alone Pump Sampling

Two SAPS stations were carried out. The location was chosen using the CTD optical back scatter data that showed a strong (max 34mV) broad signal from 2725 - 2925m on the down cast and from 2800 - 2925m on the up cast. Out of all the CTD data this station had the broadest plume with the strongest signal.

A 450 kg weight, pinger and 4 SAPS along with a MAPR each, were attached to a plastic coated wire at 25m intervals and lowered (30m/min) into the ocean. The wire was stopped with the pinger 60m off the sea floor (weight 35m off bottom) putting the first SAPS at 2900m. Three more SAPS continued up the wire at 25m increments with the top station at 2825m. The filters used were 293mm 1 μ m nuclepore membrane filters.

SAPS01 had to be aborted after 2 .5 hours, but as the pumps had already started, the filters were kept as background samples. COSAP04, 03, 02 and SN005 pumped 373.5, 28, 146 and 170L respectively.

SAPS02 was completed and the pumps switched on at the correct depth for 2 hours and then returned to the surface (hauling @ 40m/min). COSAP04, 03, 02 and SN005 pumped 1299, 1534, 532 and 1246L respectively. Precipitate was observed on the filter membrane and the MAPR data showed positive optical back scatter signals compared to the background signals during the time the pumps were switched on. This precipitate can be inferred to be hydrothermal plume precipitate. (S.Bennett)

9. Electrochemical Measurements

9.a) Background

Although abundant in the Earth's crust iron (Fe) is relatively insoluble in oxygenated sea water resulting in concentrations that are known to limit phytoplankton growth and nitrogen fixation rates over large areas of the ocean. For marine geochemists, one of the most important aspects of iron is that it precipitates rapidly in hydrothermal plumes, modifying the gross flux from vents to the oceans. But if only a small proportion of dissolved Fe escapes from hydrothermal plumes it could dominate the budget for deep-ocean dissolved Fe. It is therefore essential to understand the biogeochemical cycling of Fe in hydrothermal systems and their influence throughout the deep ocean. Our knowledge of Fe speciation in seawater, however, is severely limited due to a lack of measurements of Fe concentrations and its degree of organic complexation in seawater. The few existing electrochemical measurements of Fe speciation demonstrate that greater than 99% of the operationally defined "dissolved" Fe that passes through a 0.4 micron filter is strongly bound to organic ligands of presumed biological origin. Our knowledge of Fe speciation in deep waters is also severely lacking due to lack of data, while our knowledge of Fe speciation in hydrothermal plumes is virtually zero except for limited studies on size fractionation. Organic complexation has been measured on deep samples collected in the Sub-Arctic North Pacific and shown to be also highly complexed. However the origin of these ligands is completely unknown. Colloidal (0.4 micron - 0.02 microns molecular diameter) Fe and binding ligands may be the driving force in Fe hydrothermal inputs into the deep ocean keeping the Fe in solution long enough for hydrothermal inputs to play an important role in the Fe deep-ocean budget.

This study aims to investigate Fe organic complexation in deep water samples in distil and plume samples from a newly discovered vent site close to Ascension Island in the South Atlantic. Major goals of the study are to elucidate the dominant size fraction, concentration and binding strength of

these ligands along with determining the concentration of free iron available and ultimately the organically bound fraction.

9.b) Electrochemistry equipment.

This system is used for on-board measurements of Fe-organic complexation. This data can be used with total Fe data to model the ligand concentrations, the different class of ligand (L1, L2), the conditional stability constants of these different ligand classes, and Fe(III)' (soluble inorganic Fe(III) hydrolysis species). The instrumentation used consists of a PAR303A hanging mercury drop electrode connected to an Ecochemie 303 Interface and an Ecochemie μ Autolab 3 voltammeter; the system was run using GPES software. During D286 major problems were encountered with the system. However after servicing and air-freighting out to Ascension in time for CD169 the 303A electrode was found to be in full working order and preliminary studies were undertaken on collected samples.

9.c) Methodology.

Seawater was collected using the CTD at stations and depths in the plume and in the background (Table 9.1). Samples were pressure filtered using research grade nitrogen through an acid washed 0.4 micron polycarbonate filter and collected in Teflon bottles. Samples for immediate analysis were placed in the fridge while the majority of the samples were frozen for subsequent analysis at SOC. Previous studies have shown that immediate freezing of the samples retains the integrity of the sample for future speciation studies. Analysis will be undertaken at SOC using the technique of CLE-ACSV (Competitive ligand exchange – adsorptive cathodic stripping voltammetry) with the added ligand TAC. Complexing capacity titrations will be undertaken on the samples to determine the Fe-TAC response over a series of increasing Fe concentrations (0.1 to 20 nM). Total dissolved Fe will be measured in the laboratory at Southampton Oceanography Centre. The seawater will be subjected to UV irradiation and analysed using CSV with DHN as the added ligand. Total Fe values will also be determined using high-resolution isotope dilution inductively coupled plasma mass spectrometry after Mg(OH)₂ coprecipitation or solvent extraction and determination by GFAAS (graphite furnace atomic absorption spectroscopy). After the total values have been measured, the numbers combined with the complexing capacity titrations can then be used to yield the ligand concentrations, the different class of ligand, the conditional stability constants of these different ligand classes, and Fe(III)' (soluble inorganic Fe(III) hydrolysis species).

<u>Table 9.1</u> CTD stations sampled for Fe speciation studies during CD169. (Fridge samples in italics)

CTD #	Sample #	OTE Bottle #
3	1	24
	9	8
5	3	10
7	3	8
8	5	14
9	2	6
10	6	12
	6	12
	7	14
	7	14
	8	16
	9	18
	10	20

11	4	8
	5	10
	6	12
15	3	11
	4	12
	5	13
	6	14
16	15	15
	16	16
	17	17
	18	18
	22	22

9.d) Preliminary Results.

Only a limited number of samples were run on-board ship due to the time constraints and length required for each titration (~ 4 hours). Initial data from samples analysed on ship showed evidence for organic complexation. Figure 2 shows a complexing capacity titration for Niskin Bottle #14 from CTD cast 10. Linear analysis of this data yields a ligand concentration of 2.10 nM with a logKL of 11.9. This is consistent with deep ocean ligand concentrations and depths, comparing favourably with data from the tropical deep Pacific (2.5 nM and 11.2 log KL) and the sub-Arctic North Pacific (1.76 nM and 12.1 Log KL).

9.e) Future Work.

All frozen samples collected will be air freighted to SOC and analysed using the same equipment in the SOC clean electrochemistry laboratory. Totals will be determined and speciation calculations undertaken using the linear approach and compared with a non-linear modelling programme.

(G.Fones)

10. Petrological Sampling

10.a) Deployments

Rock chipper stations were made by the ship maintaining a constant position and deploying the chipper over the starboard side on a 6mm hydro-wire at a rate of ≤ 60 m/minute. The chipper hit the seafloor at this speed, after which it was withdrawn at 5m/min until 5 m above the bottom and then recovered at 60m/min.

Rock dredge stations were made by the ship maintaining a constant position and deploying the dredge over the aft at a rate of ≤ 60 m/minute on the 16mm coring warp. Once on the seafloor, the ship made for an end way-point at a rate of 1kt. (30m/min) over the ground, and the dredge wire was veered at a rate of 10-15m/min. The pinger was kept to 50-100m off bottom. At the end of the haul, the package was recovered, stowed and the dredge samples sorted and bagged.

10.b) Problems encountered during deployments

Difficulties arose with the rock-chipper when, on station RC07, the package encountered resistance on pulling off the bottom. There was no sediment at the location, and the chipper probably snagged on a loose rock. The crew operating the winch used the recommended technique for dealing with this situation, and at no time exceeded the safe working load as displayed on the CLAM system. However, on being informed of the incident later, by the scientist on watch at the time, it was explained that the maximum load had been 1800 kg. Recognising this to be close to the maximum load-bearing of the 6mm hydro-wire, I enquired why this was inconsistent with the CLAM system display. On investigation, it was found that the CLAM had displayed parameters inappropriate to the hydro-wire. This caused a potentially dangerous situation. As a result of the incident, officially reported as a "near miss" by the TLO, elsewhere, >3000m of damaged wire was removed and stowed on deck.

The winch drivers' consoles, both inside the Main lab. and at the winch driving stations, display incorrect operational data. For example, the brake light is on, even when the brake is off. The speed control knob does not correlate with the positions marked on the consol, e.g. when the control is set to the neutral position the winch still either hauls or veers. This is unsafe and must be rectified.

A hydraulic pipe on the starboard gantry burst through corrosion. The duty engineer immediately repaired it, but the repair took about two hours. Luckily the chipper was stopped at 28m and the weather fair at the time.

10.c) Scientific Samples Obtained

On the basis of available bathymetry (SIMRAD EM12 and ABE-derived SM2000) and TOBIderived sidescan sonar imagery, the active Southern Mid-Atlantic Ridge axis was located for sampling by rock chipping and dredging. Twenty two chipper sites and 4 dredge sites were chosen (see Appendix F). In addition, MAPRs (Mini Autonomous Plume Recorders) were attached to the chipper (20m above) and dredge wire (beside the pinger at 150m above the dredge) and recorded depth, pressure, temperature and particulate backscatter – see Section 7, above.

Much of the central part of segment 2 (5° S) was sampled, including multiple stations across the area of sheet flows, the hydrothermal sources and the surrounding older hummocky lava terrain. The ends of the segment were also sampled, but with rather poor recovery.

10.d) Preliminary Scientific Highlights:

Station RC07, central north segment 2, recovered abundant iron oxide sediment, fresh glass and small fragments of sulphide. The station was chosen on the basis of two criteria: it is directly below the strongest, and depth extensive plume signal obtained by the MAPRs during the Leg 1 TOBI survey. There also appears at this position an unusual-shaped feature (resembling a 'Mexican's Hat') on the TOBI imagery that overlays and buries fissures in the unsedimented and young sheet flow. The MAPR profile from RC07 showed a tall and dense particulate plume that extended to the seafloor. Combined with the sulphide fragments, this site appears to support an active, high-temperature hydrothermal vent.

Dredge 02, on the central sheet flows and Mexican's Hat area, recovered a variety of extremely fresh lavas, including frozen wave-like structures of glass, several centimetres thick. These structures indicate extremely rapid flow rates for this sheet flow, an inference supported by frozen eddies on the surface on the sheet flow, seen on ABE photographs of the area.

Dredge 04, on the central axial sheet flow and areas with Eh and positive temperature anomalies, recovered extremely fresh glassy sheet flows, several to tens of centimetres thick. Also recovered was a small white crab (10cm x 5cm), a gastropod shell (6mm long) and fragments of mussel shell. These are vent fauna and were observed *in situ* on ABE photographs.

(B.Murton)

11. Biological Investigations

11.a) Overview

Hypothesis-driven investigations of ecosystems in different oceanic regions can provide immediate insights into the processes controlling regional biogeographic patterns and the evolution of chemosynthetic fauna. Understanding how biogeographic processes shape faunal evolution can be achieved through the identification of key ridge localities like the South Atlantic that will yield large first order "jumps" in our knowledge of faunal evolution and biogeography. Hypotheses for the South Atlantic are founded on this premise, as well as on the finding that the recently-discovered Central Indian Ridge faunal province hosts fauna that are distinct (with only one species exception) from the biologically characterized vent ecosystems of the northern Mid-Atlantic Ridge. The overarching hypothesis is that the Equatorial Atlantic Fracture Zones act as a large-scale barrier or species-specific filter to along-axis dispersal and dispersion of species in two ways:

H1) the physical displacement of adjacent segments of the volcanically-active MAR axis, across the Romanche and Chain Fracture Zones, leads to a prohibitively large geographic separation (order 1,000km) between adjacent active high-temperature hydrothermal fields.

H2) strong regional-scale currents flow across the MAR axis, from West to East, through both the Romanche and Chain Fracture Zones. The oceanographic currents of the Fracture Zones as well as their geological structure inhibit along-axis transport of larvae (and species).

To address these hypotheses, my goal during this cruise was to: 1) determine the structure and distribution of vent faunal communities and their associated geological setting on the Southern Mid-Atlantic Ridge via detailed digital imaging surveys, mosaic-mapping, and faunal sampling (via complementary De-Ridge remotely operated vehicle programs) in areas that span the diversity of observed habitats, and 2) to elucidate the distribution of venting activity and habitat diversity through detailed photo-characterization of constituent communities for future detailed biological studies, and demonstrate the utility of AUV technology, (specifically ABE) for hydrothermal

biological research through nested Phase II to Phase III approaches.

11.b) Autonomous characterization of venting activity, biological communities and habitat distribution using ABE.

Phase III overlapping image surveys acquired 12bit images every 5 seconds during 2 ABE dives employing 5m trackline spacing and speeds of 0.4 to 0.6 m/sec. A trigger feature was enabled that upon completion of an initial broad survey, ABE would center the next grid based on binning, within a spatially discrete area, the highest average temperature and Eh anomalies. The tracklines for the trigger surveys were 100 x 100 meters in the opposite direction and diagonal from the initial survey box. The imaging surveys were conducted from 4 to 5 meters altitude to permit the mosaic mapping of spatial relationships and associations among biological, hydrothermal, and geological phenomena.

Table 11.1. ABE biological image statistics

	Total # of
Area	images /
	dive
Southern	6421
Northern	11374
	Southern

Southern Phase II area: Based on E_h and Temperature anomalies during ABE dive 153 (a Phase III survey in which the digital black and white camera system did not work), an 80 x 80 meter box located at the northern end of a north-south collapsed pit, and an 80 x 100m box, 25 meters to the southeast. ABE images revealed a broad spectrum of lava morphologies surrounding a series of linear collapsed lava pits with several sulfide chimneys constructed from the base of the pits. Images of the southeastern area revealed extensive and discrete mussel communities hosting gastropods, shrimp, clams, and barnacles in cracks and crevices associated with sheet and hackly lava flows.

Northern Phase II area: ABE images revealed at least one black smoker and the presence of abundant shrimp, resembling *Rimicaris*. No live mussels were observed.

11.c) Biological Collections

One brachyuran crab was collected during Dredge 04. This specimen was preserved and transported to the Woods Hole Oceanographic Institution.

			1	0	
Dredge			Lat'	Lon°	
#	Julian		Start	Start	Depth
DR04	Day	Time	End	End	(m)
On			4	12	
bottom	074	21:56	47.63	22.69	3043
Off			4	12	
bottom	075	01:10	48.98	12.83	3276

Table 11.2. Biological sample and dredge location.

SUMMARY

RRS *Charles Darwin* Cruise CD169 enjoyed remarkable success. We were able to systematically survey approximately 200km of the Mid-Atlantic Ridge crest south of the Equator (ca.3-7°S) and

investigate the interplay of volcanic, tectonic and hydrothermal activity. Evidence for hightemperature hydrothermal venting was discovered in two locations, one of which had not even been mapped by multi-beam swath bathymetry before the cruise began. Using SOC's TOBI deep-tow sidescan vehicle, equipped with NOAA-PMEL MAPRs we were able to identify particle laden plumes and using a CTD-rosette water samples were taken from these plumes to confirm, geochemically, that they were hydrothermal in nature. One of these sites was in a non-transform discontinuity between two adjacent 2nd order ridge segments. The other was at the very centre of a spreading ridge segment which, TOBI revealed, hosted an area of ca.15km2 of geologically fresh, unfaulted lava flows. By the end of the 2nd Leg of our cruise, tha ABE autonomous underwater vehicle had managed to precisely locate and photograph the first vent-sites ever to be found in the South Atlantic Ocean and reveal the dominant fauna inhabiting the area. The data gathered was sufficient to guide a complementary ROV cruise by the German Ridge Program, aboard RV *Meteor*, directly to these sites less than one month after they were found. As well as proving an extremely efficient mode of hydrothermal exploration, the TOBI/ABE combination also allowed a full program of CTD and rock-sampling operations to be undertaken while ABE was operating autonomously at the seabed.

Although RRS Charles Darwin Cruise CD169 enjoyed considerable success, it was not without disappointments, too. To be fair, the ship itself was in much better condition when the PSO last sailed on her in 2001 (CD127, CD128) when a number of failures led to near collapse of the science programme. Nonetheless, it should be recognized that a "near-miss" in complete power failure of the vessel came close to causing the loss of TOBI which was being towed some kilometers behind the ship and only 350m above the seafloor at the time. The ship's engineers deserve particular credit for averting that problem as promptly as they did – with only minutes to spare! Another continuing setback was with the BRIDGET deep-tow. Ian Rouse and Dave White struggled committedly throughout the cruise to render the vehicle useful for science which they achieved during the last 12 hours of station work. It was fortunate that the rest of the science programme managed without the BRIDGET data but it would have been much higher quality had that been available from the outset. Perhaps the most disappointing outcome for the cruise, however, was from the CTD. During 20 years of seagoing this has routinely been considered the most reliable piece of equipment that one can turn to when all else fails. Instead, during much of the cruise it was questionable how reliable the system was and, throughout, it proved impossible to obtain reliable optical back-scatter data from the UKORS instrument – something that has been a mainstay of such research in the UK since at least 1988 (Discovery 176). For this cruise, however, the only safe approach was to attach a NOAA-PMEL MAPR to all CTD deployments to ensure that reliable results were obtained.

(C.German)

ACKNOWLEDGEMENTS

I am pleased to the have the opportunity to thank Capt.P.Sarjeant and the Officers and Crew of the RRS *Charles Darwin* for the efficacy with which the cruise was conducted. Everyone made their contributions, from the officers of the watch with their ship handling and station keeping skills to the deck hands helping with novel ABE deployments; from the galley crew who did so much to keep spirits high to the engineers who so narrowly averted the demise of TOBI at the end of Leg 1 – all overseen by the watchful eye of a Master who takes pride in a safely run vessel.

Our science party also enjoyed great support from our Technical support team from UKORS. Particular thanks go to Dave Turner, TLO, for helping organize our way through some rather trying times – at one point we had NO operating instrumentation that was fit to be deployed over the side of the ship – and to Ian Rouse who worked tenaciously during Leg 1 to trouble-shoot and repair TOBI on the sole occasion when that instrument encountered problems. With support like that, UK Marine Science should only continue to prosper.

RRS *Charles Darwin* Cruise CD169 would have been impossible without the financial support of NERC through core strategic funding to the Fluid Fluxes Group and the Ocean Crust Group of the Challenger Division for Seafloor Processes, Southampton Oceanography Centre, UK. In addition, essential funding to enable participation of the Woods Hole Oceanographic Institution's science team and their ABE autonomous underwater vehicle was provided through the NOAA Ocean Exploration program in the USA. Additional funding was also provided by NERC via a PhD studentship to Ms.Sarah Bennett and by the Census of Marine Life "ChEss" program (Chemosynthetic Ecosystems) for which location of the first vents and vent-ecosystems on the Southern Mid-Atlantic Ridge had been a very high priority.

(C.German)

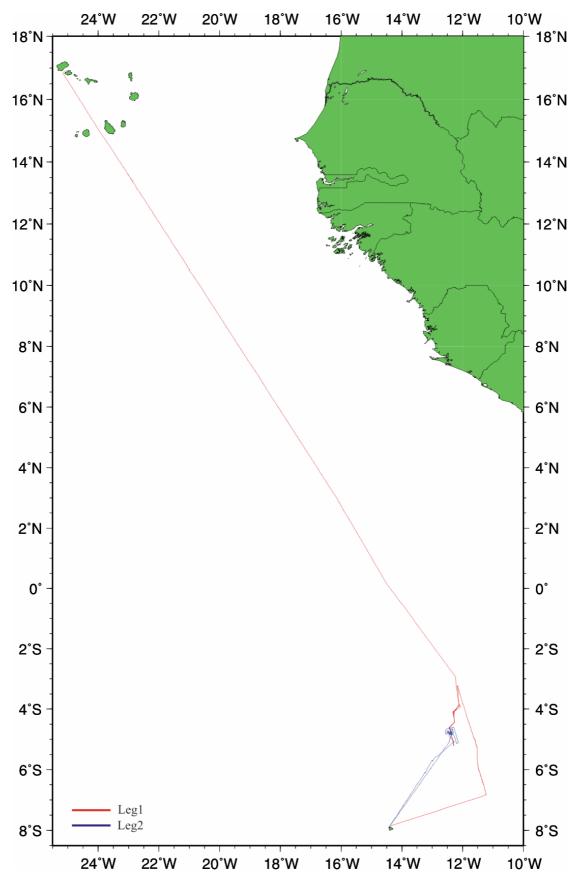
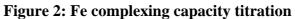
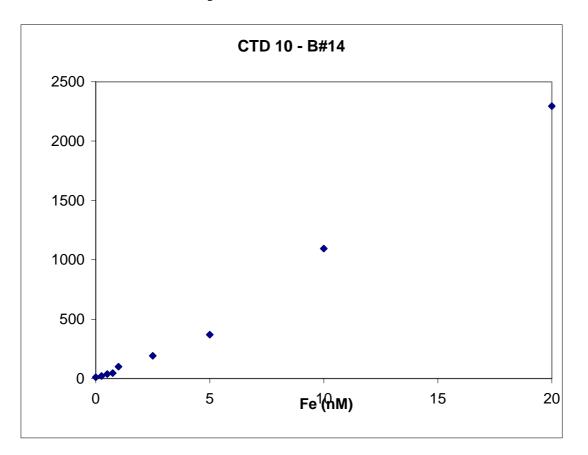


Figure 1: RRS Charles Darwin CD169 Cruise Track





(see Science Report 9: Electrochemical Measurements)

APPENDIX A – DIARY OF EVENTS

Times in text are UTC-1 'til 0100, 22nd February, thence UTC

2005-02-16 0900 Scientific & Technical staff for CD 169 join vessel. Minor mobilisation work underway. Vessel bunkering and taking FW & fresh provisions this day. RSU Crew reliefs. 1500 Sign on of Scientific & Technical party + Safety Briefing & Familiarisation Tour. 2005-02-17 0800 Completing alongside tasks. 0855 Complete tests of ME, Bow Thrust & Steering Gear - all satisfactory. 0912 ERSB 0923 Last line 0930 Clear of breakwater 0936 RFA on passage; B'water 120 degs @ 0.6nm 1200 16 37.8N 25 01.5W Wind NE 20 knots 1615 Emergency & Boat Stations muster 2005-02-18 0001 14 55.8N 23 55.3W 0925 V/I heaving-to for CTD test deployment 13 35.9N 23 00.9W CTD01 deployed 0934 CTD recovered 1010 1030 13 35.3N 23 00.8W Resume transit @ 2 knots; streaming deep tow cable 1200 13 29.6N 22 56.8W Continue streaming deep tow; v/l speed 6 knots; Wind NE 22 knots 1318 13 23.8N 22 53.1W Commence hauling deep tow 1606 13 11.7N 22 45.5W Deep tow cable recovered; resume transit @ 125 rpm 2005-02-19 0001 12 05.3N 22 01.7W 1037 10 33.4N 21 01.7W Commence Swath recording on passage 1200 10 25.5N 20 57.5W Wind NExN 10 knots 2005-02-20 0001 08 40.1N 19 48.2W 06 52.8N 18 38.2W Wind NE 10 knots 1200 2005-02-21 0000 05 08.2N 17 31.2W 1200 03 28.2N 16 27.0W Wind Light & Variable 1424 03 07.6N 16 13.9W Reduce to 118rpm @ ER request due to high LT circuit temps 1600 02 55.5N 16 05.6W Adj. co. to 150 degs (T&G) 1610 02 53.3N 16 04.9W Further reduction to 113rpm 1920 02 27.3N 15 50.1W Further reduction to 105rpm 2005-02-22 0100 01 47.7N 15 27.1W Clocks advanced 1hr to GMT 1200 00 32.4N 14 43.6W Wind SSE 15 knots 1447 00 11.6N 14 31.7W Adj. co. to 144 degs (T&G) 1510 00 08.9N 14 30.0W Incr. to 123rpm 2005-02-23 0001 00 55.8S 13 41.6W 02 19.8S 12 40.5W Wind SE 20 knots; v/l pitching heavily @ times 1200 1742 02 56.5S 12 14.0W Commence Swath survey proper; adj co. to 176 degs (T&G) 1936 03 13.3S 12 12.8W Adj. co to 171 degs (T&G) 2005-02-24 0006 03 52.8S 12 07.1W A/c to 219 degs (T&G) 0200 04 06.3S 12 17.9W A/c to 175 degs (T&G) 0415 04 26.0S 12 16.8W A/c to 224 degs (T&G)

0600 04 37.2S 12 27.0W A/c to 166 degs (T&G) 0625 04 41.0S 12 26.0W A/c to 150 degs (T&G) 0728 04 48.4S 12 21.8W A/c to 165 degs (T&G) 0735 04 49.5S 12 21.5W A/c to 195 degs (T&G) 0745 04 51.2S 12 21.9W A/c to 180 degs (T&G) 04 54.3S 12 22.0W A/c to 165 degs (T&G) 0810 05 08.1S 12 18.4W Slowing at termination of s-bound Swath run 1000 1033 05 10.9S 12 17.8W 10kHz sonar fish deployed 1036 3.5kHz PES deployed 1111 05 11.4S 12 18.0W Commence TOBI deployment; streaming MAPR string 1139 MAPR string streamed & stoppered-off 1148 **TOBI** outboard 1150 **TOBI** umbilical streamed Wind SE 10 knots 1218 Depressor wt connections complete & tested 1221 05 12.1S 12 18.0W Depressor wt outboard; MAPRs attached @ 0 & 50 metres; veering deep tow cable 1237 05 12.3S 12 17.9W Cease veer @ 300m; commence turn @ 10 degs/min & 3 knots 1257 05 12.0S 12 17.5W Turn completed & resume veering cable 1400 onwards Adjustments of co & speed as necessary to meet track requirements 2005-02-25 0025 04 49.0S 12 23.0W A/c to 349 degs (T&G) 0618 04 36.6S 12 25.3W Commence turn to stbd @ 1 degree/min 0730 04 34.6S 12 24.3W Settled on new co. 048 degs (T&G) 04 27.6S 12 16.5W Commence turn @ 2 degs/min to 352 degs 1151 1200 04 27.3S 12 16.3W Wind SSE 15 knots 1615 Emergency exercises/familiarisation 1630 04 15.7S 12 17.3W A/c to 000 degs (T&G) 2015 04 06.2S 12 17.2W Commence turn @ 2 degs/min 2104 04 04.7S 12 16.4W Settled on new course, 038 degs (T&G) 2005-02-26 0001 03 59.4S 12 12.3W 03 58.3S 12 11.5W TOBI signal fails; commence hauling 0037 0410 03 52.0S 12 07.2W Slow course change towards recovery heading 03 51.8S 12 06.1W Cease hauling @ 1000m wire out 0500 0630 03 55.0S 12 04.9W Resume hauling 0722 Depressor wt recovered & MAPR string stoppered-off 0737 Prop stop - heading & forward way maintained by bow thrusters 0747 TOBI landed on deck 0811 03 56.4S 12 04.9W MAPR string recovered; securing deck 0900 Repositioning for CTD station 0955 04 04.6S 12 16.1W CTD02 deployed 1105 CTD near bottom 1200 04 04.6S 12 16.2W Wind SE 15 knots 1315 CTD recovered 1352 Streaming TOBI umbilical for test purposes 04 06.2S 12 16.5W Umbilical recovered; repositioning to Rock Chipper (RC) site 1431 04 11.0S 12 17.5W Hove-to on station 1510 1603 RC deployed; RC01 04 11.6S 12 18.6W RC recovered 1830 04 06.1S 12 16.6W A/c to 288 degs (T&G) 1940 2011 04 05.7S 12 19.5W Hove-to awaiting TOBI repairs 2044 Decision to continue other work o'night; v/l heading for CTD statn. 2157 04 00.3S 12 13.0W CTD03 deployed 2317 Hauling from 4120m 2005-02-27 0128 04 00.3S 12 13.1W CTD recovered; repositioning to RC02 0246 04 06.0S 12 18.1W RC deployed; RC02 04 06.5S 12 18.0W RC recovered 0500 04 08.7S 12 18.1W RC deployed; RC03 0612 0803 04 08.5S 12 18.0W RC recovered; repositioning to RC04

0858 04 13.8S 12 17.1W RC deployed: RC04 1032 04 13.7S 12 17.0W RC recovered 1041 Set co. for TOBI deployment position 1143 04 05.5S 12 19.2W Hove-to @ position; Wind SE 15 knots 1316 04 05.8S 12 19.3W Commence deploying MAPR string 1352 TOBI streamed 1414 Depressor wt streamed 1424 04 06.2S 12 19.4W Commence veering Deep Tow cable: slow turn onto track (038 degs) 2124 03 56.4S 12 10.0W A/c to 031 degs (T&G) 2359 03 51.9S 12 07.2W A/c to 351 degs (T&G) 2005-02-28 0630 03 35.6S 12 09.2W A/c to 002 degs (T&G) 0900 03 29.8S 12 09.0W Hauling Deep Tow & running ahead on Bow Thrust due to fan failure in SCR cabinet of propulsion system 1000 TOBI 800m off bottom; prop system off for repairs 1130 03 25.1S 12 08.9W Main propulsion back on line; veering TOBI to preferred depth 1200 03 24.3S 12 08.8W Wind SE 12 knots 03 19.0S 12 10.0W Commence hauling for TOBI recovery prior relocation 1431 03 14.8S 12 10.9W Altering course, head-to-wind 1620 1720 03 14.7S 12 09.7W Recovering Depressor wt & hanging-off MAPR string 1800 TOBI landed on deck 1825 03 15.0S 12 09.3W MAPR string recovered; set co 163 degs for new deployment site 2005-03-01 0001 03 54.2S 11 57.9W 0832 04 55.8S 11 38.3W V/I @ 0.5 knot; Commence deploying MAPR string 0855 04 55.8S 11 38.4W Streaming TOBI 0927 04 55.8S 11 38.5W Depressor wt outboard & commence veering Deep Tow cable 1124 04 58.6S 11 37.4W A/c to 135 degs (T&G) 1200 04 59.4S 11 37.2W Wind SSE 15 knots 05 00.3S 11 35.7W A/c 170 degs (T&G) 1242 05 09.3S 11 33.9W A/c 162 degs (T&G) 1645 2054 05 18.0S 11 31.1W A/c 182 degs (T&G) 2005-03-02 0001 05 25.3S 11 31.2W 05 32.7S 11 31.6W A/c 176 degs (T&G) 0304 05 49.0S 11 30.3W A/c 169 degs (T&G) 0948 05 54.0S 11 29.5W Wind SExE 20 knots 1200 1407 05 59.0S 11 28.6W A/c 163 degs (T&G) 2005-03-03 0001 06 20.8S 11 21.6W 06 26.5S 11 19.8W A/c 161 degs (T&G) 0234 0655 06 36.2S 11 16.4W V/I suffers total loss of power 0700 Propulsion restored; v/l heading 190 degs; rpm increased to 100+ initially to re-tension TOBI tow. 0740 06 38.1S 11 16.6W Co restored to 164 degs; speed 2 - 2.5 knots 06 41.4S 11 15.9W Second loss of power 0855 0858 Propulsion restored 06 44.4S 11 14.9W Commence hauling TOBI 1033 06 47.5S 11 14.0W Wind ExS 17 knots 1200 06 49.6S 11 13.5W Reduce rpm to < 1 kn thro' water 1258 06 49.8S 11.13.7W Depressor wt recovered & MAPR string hung-off 1320 06 49.9S 11 15.9W TOBI recovered to deck 1341 1400 3.5 & 10 kHz fish inboard 1405 MAPR string recovered 1406 06 50.1S 11 14.0W Set co for Ascension Is. 2005-03-04 0001 07 23.1S 12 54.2W 0600 07 41.9S 13 54.6W 0855 A/c 180 degs, NW of Ascension Is

0900 07 52.8S 14 24.7W EoP: ERSB Comp satisfactory ME, BT & steering gear tests 0906 0933 Commence walking back anchor 0943 Cease veer @ 6 sh in water; Bates Pt brng 115 degs x 0.72nm 0948 RFWE 1st boat transfer completed; Joiners onboard; Medical cases ashore 1015 1138 Baggage exchange completed via pontoon. Wind SExS 12 knots 1218 Launch a'side with Agent & medical cases. 1248 Ship's business completed; Agent & leavers away Vessel completing equipment shifts & essential generator maintenance 1630 ME, steering gear & BT tested & satisfactory 1636 ERSB 1639 Comm heaving anchor 1655 4 sh on deck Anchor's aweigh; v/l manoeuvring clear of anchorage 1710 RFAoP; Bates Rock brng 139 degs x 1.8nm; set co 033 for work area 1940 07 1724 35.2S 14 13.0W Heave to for ABE maintenance 2008 Resume passage 2005-03-05 0003 07 04.1S 13 52.9W 0655 06 06.4S 13 15.0W Heave to on station 0720 06 06.3S 13 14.9W CTD04 deployed 0830 USBL spar lowered 1005 USBL spar recovered 1010 06 06.7S 13 14.2W CTD recovered; resume passage 1317 05 42.0S 13 00.0W Heave to for CTD test dip. Wind SExS 15 knots 1339 05 42.1S 13 00.0W CTD05 deployed 1405 CTD recovered; repositioning to avoid longlines 1431 05 42.5S 12 59.6W CTD06 redeployed 1508 USBL spar lowered 1615 05 42.4S 12 59.4W Emergency muster & exercises 1728 05 42.6S 12 59.3W CTD recovered 05 42.7S 12 59.3W USBL spar recovered; set co 050 degs for next work area 1750 2355 05 06.8S 12 19.1W RC deployed; RC05 2005-03-06 0140 05 06.8S 12 19.4W RC recovered; commence Swath survey 0340 05 04.0S 12 17.3W RC deployed; RC06 05 04.0S 12 17.2W RC recovered; resume Swath survey 0550 04 44.3S 12 28.4W Cease swath survey; v/l bound for first transponder deployment 0810 04 47.1S 12 25.5W USBL spar lowered 0907 04 47.9S 12 24.6W Transponder #1 released 1005 1053 04 47.3S 12 24.1W 'Boxing-in' transponder 1158 Transponder position fixed; repositioning to CTD station 1200 Wind SExS 18 knots 1312 04 46.0S 12 23.1W CTD07 deployed 04 45.6S 12 23.7W CTD recovered – unsuccessful; v/l repositioning for BRIDGET 1534 deployment 1710 04 43.3S 12 25.0W Bridget streamed 1800 04 43.6S 12 24.6W Co 120 degs @ 0.8 knots; veering deep tow 1820 Co 100 degs @ 0.4 knots 1930 04 44.1S 12 23.6W Hauling Bridget due technical problems 2046 Commence recovery 2055 04 44.9S 12 23.9W BRIDGET on deck 2117 Aft deck secure; proceeding for second transponder deployment 2210 04 47.2S 12 21.4W Commence deployment 2220 04 47.2S 12 21.3W Transponder #2 released; repositioning for #3 2315 04 49.5S 12 22.4W Transponder #3 released; 'listening' during descent 2005-03-07 0110 04 46.8S 12 20.9W 'Boxing-in' #2 transponder

0241 04 49.53S 12 22.46W #3 transponder not detected. #4 transponder released in adjacent

position 0329 04 48.9S 12 22.0W 'Boxing-in' #4 transponder 0455 04 50.7S 12 33.9W USBL spar recovered; set co for MAPR string deployment area 0525 04 48.9S 12 26.2W Heave-to & commence deployment 0608 04 49.7S 12 26.4W MAPRs all attached - continue veering deep tow cable 0703 04 50.5S 12 26.4W 2300m wire out; commence MAPR survey conducting cross tracks Mid-Atlantic ridge. 1200 04 48.3S 12 21.3W Wind SExE 5 knots 1409 04 47.1S 12 26.8W Aborted turn to stbd due wire angle; shortening cable 1523 04 44.6S 12 28.2W Slow turn to port to resume survey 1541 04 43.6S 12 28.6W USBL spar lowered 1700 04 45.0S 12 30.5W Co 098 degs @ 3 knots thro' water 2330 04 46.2S 12 21.2W Slow turn onto W'ly heading 2005-03-08 0324 04 46.3S 12 26.1W Commence hauling MAPR string 0507 First of MAPRs at surface 0615 04 47.0S 12 30.8W MAPR string recovered & USBL spar retracted 0735 04 46.8S 12 23.4W Hove-to & RC (07) deployed 04 47.0S 12 23.4W RC recovered; v/l repositioning 0816 0832 04 46.6S 12 23.1W V/I repositioned; deployment resumed 04 46.8S 12 23.2W RC on bottom 0925 1120 04 47.0S 12 23.4W RC recovered; proceeding to RC08 1206 04 46.1S 12 22.5W RC08 deployed; Wind SSE 18 knots 1258 04 46.25S 12 22.61W RC on bottom 1404 04 46.3S 12 22.6W RC recovered; v/l repositioning 1444 04 48.5S 12 21.1W USBL spar lowered 1514-1541 CTD08 test dip; thence preparing for ABE deployment 1635 04 48.4S 12 21.2W ABE released (ABE150); v/l hove-to for monitoring 1810 04 48.9S 12 21.2W Re-locating for CTD deployment 1844 04 49.5S 12 21.9W CTD09 deployed 2125 04 49.9S 12 21.5W CTD recovered; v/l re-locating 2315 04 46.9S 12 23.6W CTD10 deployed 2005-03-09 0144 04 47.0S 12 23.4W CTD recovered; v/l re-locating 0236 04 48.8S 12 22.9W RC09 deployed 04 48.8S 12 22.9W RC recovered; v/l re-locating 0445 04 47.7S 12 22.0W RC10 deployed 0540 04 47.6S 12 22.1W RC recovered; v/l repositioning 0733 04 50.9S 12 22.2W RC11 deployed 0848 04 51.2S 12 22.1W RC recovered; v/l repositioning for CTD station 1045 04 48.6S 12 21.7W CTD11 deployed; Wind SExE 14 knots 1152 04 48.5S 12 21.9W CTD recovered; v/l repositioning 1414 04 46.8S 12 22.1W Hove-to; reeling off & cropping Hydro Wire 1620 04 47.7S 12 22.0W CTD12 deployed 1920 2156 04 47.7S 12 21.8W CTD recovered 2300 04 47.3S 12 24.9W Hove-to awaiting surfacing of ABE 04 47.3S 12 24.8W ABE sighted on surface; range approx 7 cables 2341 2005-03-10 0030 04 47.4S 12 24.6W Lifting line hooked-on ABE 0040 04 47.4S 12 24.8W ABE clear of water & landed on cradle 04 47.3S 12 24.8W USBL pole retracted & gate valve closed 0056 0134 04 45.6S 12 23.7W RC12 deployed 0139 Hydraulic failure; 28m wire out 0339 Resume veering 0540 04 45.8S 12 24.0W RC recovered; v/l repositioning 0620 04 47.4S 12 24.6W RC13 deployed 04 47.2S 12 24.4W RC recovered; v/l repositioning 0823 0902 04 49.5S 12 24.0W RC14 deployed 1104 04 49.5S 12 24.0W RC recovered; v/l repositioning 04 50.1S 12 23.3W RC15 deployed; Wind SE 19 knots 1130 1339 04 50.2S 12 23.2W RC recovered; v/l repositioning

1414 04 48.5S 12 23.0W USBL spar lowered 1700 CTD deployed for cleaning purposes 1736 CTD recovered 1810 04 48.6S 12 23.0W Re-positioning for ABE deployment 1852 04 48.6S 12 22.9W ABE released; v/l hove-to for monitoring 1908 Re-positioning for CTD#10 1925 04 48.0S 12 22.5W CTD13 deployed 2230 04 47.9S 12 22.4W CTD recovered 2245 USBL spar retracted; v/l relocating for rock dredge 2005-03-11 0113 04 38.3S 12 25.4W Commence streaming Dredge #1 0300 04 38.3S 12 25.3W Dredge on bottom 0535 04 39.1S 12 24.8W Off bottom 0735 04 40.1S 12 25.1W Dredge recovered; courses various (Swath?) 04 48.2S 12 22.4W USBL spar lowered 0950 1020 Repositioning for CTD#11 1045 04 48.5S 12 22.3W CTD14 deployed 04 48.6S 12 22.4W CTD recovered; Wind SExE 18 knots 1322 04 47.3S 12 23.3W Hove-to awaiting ABE recovery 1446 1640 04 47.6S 12 23.0W ABE on surface 1658 'Hooked & tagged' 04 47.4S 12 23.2W ABE 'cradled' 1700 04 47.7S 12 23.1W USBL spar retracted; v/l repositioning for Swath survey run 1728 1812 04 48.6S 12 17.9W Commence Swath survey; co 345 degs 1915 04 39.9S 12 21.0W Complete survey & a/c for Dredge start pt. 2008 04 44.3S 12 23.4W Commence streaming Dredge #2 2251 04 44.4S 12 22.2W Dredge off bottom 2005-03-12 0044 04 45.3S 12 21.9W Dredge recovered; repositioning for CTD 0136 04 47.8S 12 22.6W CTD failed @ deployment 0710 04 47.8S 12 22.6W CTD 'downtime' continues 04 47.8S 12 22.5W USBL spar lowered 0854 1105 04 48.6S 12 23.3W Hove-to for ABE deployment 1236 Commence ABE deployment; Wind SExS 10 knots 1252 04 48.7S 12 22.5W ABE released; monitoring to bottom 1600 04 48.8S 12 22.5W Hove-to awaiting instructions 1620 Repositioning for BRIDGET deployment 1722 04 45.9S 12 23.7W Commence streaming BRIDGET 04 46.5S 12 23.2W Cease veer at 2900m wire out 1900 1920 04 46.8S 12 23.0W Towing BRIDGET - CMG 162 degs; speed 1.0 knots 04 48.7S 12 22.3W Commence hauling BRIDGET 2116 2248 04 50.3S 12 21.8W BRIDGET on deck 2307 Relocating to RC site 2005-03-13 04 48.5S 12 21.3W RC16 deployed 0125 0223 04 48.48S 12 21.25W RC at bottom 0326 04 48.6S 12 21.1W RC recovered; v/l relocating for ABE recovery 04 48.4S 12 22.7W ABE on surface 0550 04 48.5S 12 23.0W 'Hooked & tagged' 0618 0620 'Cradled' 0642 USBL spar retracted; v/l relocating for Swath survey 0748 04 53.3S 12 16.6W Commence Swath survey; CMG 163 degs; speed 9.5 knots 0832 04 59.0S 12 14.8W Hove-to @ Watch leader's request 0903 Resume Swath survey 1020 05 08.2S 12 11.6W Hove-to for CTD test dip 1125 CTD recovered; resume Swath survey 1200 05 06.9S 12 08.2W Hdg 343 degs; Wind SExS 20 knots 1522 04 35.9S 12 17.8W A/c 254 degs 04 40.4S 12 32.6W A/c 198 degs 1700 04 45.5S 12 34.1W A/c 168 degs 1735 1807 04 49.8S 12 33.0W A/c 082 degs – bound for RC station

1937 04 48.6S 12 22.4W RC17 deployed 2100 04 48.5S 12 22.4W RC at bottom 2205 04 48.5S 12 22.3W RC recovered: v/l repositioning 2326 04 48.5S 12 22.3W CTD15 deployed 2005-03-14 0320 04 48.6S 12 22.5W CTD recovered; v/l repositioning 0525 04 47.7S 12 22.5W RC18 deployed 0722 04 47.6S 12 22.4W RC recovered 0750 04 48.1S 12 22.7W RC19 deployed 0850 04 48.04S 12 22.59W RC at bottom 0949 04 48.2S 12 22.6W RC recovered 1009 04 47.2S 12 22.8W RC20 deployed 04 47.27S 12 22.83W RC at bottom 1115 1212 04 47.4S 12 22.9W RC recovered; Wind ESE 15 knots 1324 **USBL** spar lowered 1426 04 47.8S 12 22.6W CTD16 deployed 1718 04 47.8S 12 22.7W CTD recovered 04 48.2S 12 22.7W Re-positioned for ABE deployment 1831 1959 04 48.13S 12 22.71W ABE released 2052 04 48.1S 12 22.7W Re-positioning for RC station 04 50.2S 12 22.0W RC21 deployed 2129 2234 04 50.16S 12 21.95W RC on bottom 2334 04 50.2S 12 21.8W RC recovered; re-locating for dredge station 2005-03-15 0046 04 46.4S 12 23.1W Dredge03 outboard 0202 04 46.36S 12 23.10W Dredge on bottom (3235m); incr to 1 knot OTG 0450 04 48.1S 12 21.6W Dredge recovered 0540 - 0600Checking acoustic response from ABE 0745 04 48.5S 12 22.5W Heave-to @ SAPs deployment position 0836 04 48.6S 12 22.3W Commence streaming SAPs & MAPRs string 0917 String completed; continue veering 1030 ABE inadvertently released; commence heaving SAPs string 1216 04 48.6S 12 22.3W Complete SAPs string recovery; re-positioning for ABE recovery 1336 04 47.6S 12 22.0W ABE sighted on surface; Wind SE 15 knots 1348 'Hooked & tagged' and clear of water 1353 04 47.7S 12 22.1W ABE cradled; v/l repositioning for CTD 04 48.3S 12 22.3W CTD17 deployed 1452 1745 04 48.1S 12 21.9W CTD recovered; v/l lying a-hull to provide lee for work on ABE 1830 Re-positioning to launch site 1900 04 48.6S 12 22.7W Hove-to awaiting launch 2040 04 48.63S 12 22.69W ABE released; v/l monitoring & then re-locating for dredge 2200 04 47.6S 12 22.7W Dredge04 outboard 2330 04 47.67S 12 22.68W Dredge on bottom 2005-03-16 0247 04 49.9S 12 20.9W Dredge recovered; re-positioning for RC 04 49.3S 12 21.9W RC22 deployed 0333 04 49.3S 12 21.7W RC recovered 0530 04 48.3S 12 22.8W Hove-to for ABE recovery 0600 0635 04 48.4S 12 22.6W ABE on surface 0647 'Hooked & tagged' 04 48.4S 12 22.4W ABE cradled 0650 04 48.6S 12 22.4W CTD18 deployed 0715 0951 04 48.6S 12 22.4W CTD recovered; v/l re-positioning for ABE release 1145 04 48.1S 12 22.7W Hove-to awaiting deployment; Wind SE 18 knots 1250 04 48.0S 12 22.6W ABE released; v/l re-positioning for SAPs deployment 1334 04 48.5S 12 22.3W Commence streaming SAPs 02 string 1403 All SAPs clamped to wire; continue veering to read depth 1830 04 48.5S 12 22.2W Commence hauling SAPs 2013 04 49.3S 12 22.4W All SAPs gear recovered; v/l re-positioning for BRIDGET deployment 2141 04 44.8S 12 24.6W Commence BRIDGET deployment 2156 Recovering due to technical problems

2358 04 45.7S 12 23.8W Re-deploying

2005-03-17 0320 04 47.9S 12 22.3W Commence hauling BRIDGET 04 48.7S 12 21.8W BRIDGET recovered to deck 0455 04 47.6S 12 23.5W In position for ABE recovery 0545 0600 ABE on surface 0620 04 47.7S 12 23.4W 'Hooked & tagged' 'Cradled': v/l re-locating for transponder recoveries 0625 0715 04 47.0S 12 22.0W NE transponder recovered 04 47.6S 12 25.2W NW transponder recovered 0812 USBL spar retracted & gate valve closed 0835 04 48.6S 12 23.8W S'ly transponder recovered 0908 04 49.9S 12 22.6W 'Dead' transponder not located; commence Swath run towards 0933 Ascension Island 05 06.0S 12 22.1W A/c to 214 degs (T&G); complete Swath run & science for cruise 1118 05 12.0S 12 31.3W Wind SE 18 knots 1200 06 02.3S 13 06.4W 1800 2005-03-18 06 52.3S 13 41.7W 0001 07 51.0S 14 23.7W 0600 0715 Critical bridge gear tests completed & satisfactory 0718 RSBE; EoP Pyramid Pt brng 147 degs x 1.23 nm 0742 Comm walking back port anchor Holding on at 5 sh on deck. 'CB' anchorage, Clarence Bay; RFWE. 0748

P. Sarjeant Master

		9 leg1:	scie	nce log								Swath/							Plo	tted Po	sition			
Operation	SHIP JD	Time		tude (S	Long deg	-		Dec.Lon	CMG	SMG		TOBI Line	#	TOBI W/o	Δlt	7 (m)	HDG	Decla	Dec Lo	(m) n L-bck	Lat Deg. Mir	Lo De	n g Min	Comments
operation	048	09:30		55.00		00.00	Deo.Lui				Depin	Line		11,0		2()		Deo.Lu						Depart Mindelo
CTD Test	049	10:36	13	35.91	23	00.94	13.599	23.016																CTD in water
CTD Test	049	10:53		35.87		01.07	13.598	23.018																Firing bottles @ 500m
CTD Test	049	11:10	13	35.82	23	01.10	13.597	23.018																CTD on deck, all bottles fired - probs with Salinity?
Stream Cable	049	10:55	13	35.17	23	00.80	13.586	23.013	147	6.0														Cable in water + 450kg weight
Stream Cable	049	10.00		11.65		45.35	13.194	22.756		0.0														Cable & weight inboard
Start EM12	050	11:32	10	24.24	24	02.20				10.0		01												Pagin FM12 manning or Sierra Laona Dias
Start EW12	050	11:32	10	34.21	21	02.20				10.9		01												Begin EM12 mapping nr Sierra Leone Rise
Swath	054	14:14	02	34.20	12	30.00			149	8.2	2884	Transit	14											
Swath	054	14:32		36.20		28.60			143	8.9	3062	Transit	14											
Swath Swath	054 054	14:59 15:29		39.05 42.40		26.70 24.20			149 150	7.9 8.0	3058 3046	Transit Transit	14 14											
Swath	054	16:00		45.75		21.80			141	7.7	2872	Transit	14											
Swath	054	16;30		48.80		19.20			142	8.0	2387	Transit	14											
Swath	054	17:00		51.90		17.00			142	7.9	2608	Transit	14											
Swath	054	17:30		55.10		14.70			141	8.0	2299	Transit	14											
Swath	054	17:37	-	55.90		14.10			142	8.0	2060	Transit	14											End transit, Alter course
Swath Swath	054 054	17:41 18:00		56.50 59.10		14.00 13.80			176 174	8.2 8.4	1787 2776	01 01	15 15											On course- Line 1
Swath	054	18:30		03.40		13.50			177	8.5	3500	01	15											
Swath	054	19:00		08.00		13.10			176	8.7	4020	01	15											
Swath	054	19:30		12.32		12.90			176	9.1	4058	01	15											
Swath	054	19:36		13.40		12.80			171	7.7	3932		5, 1	6										WP3: EOL1 & on course SOL2
Swath	054	20:00 20:30		16.66 20.98		12.26 11.57			172 171	9.3 9.2	3865 3166	02 02	16 16											
Swath Swath	054 054	20.30		20.98		10.94			173	9.2 8.6	3012	02	16											
Swath		21:30		29.56		10.26			178	7.7	3588	02	17											
Swath	054	22:00		33.91		09.62			175	8.6	3619	02	17											
Swath	054	22:30		38.25		08.90			169	8.5	3608	02	17											
Swath	054	23:00		42.72		08.34			171	8.9	3642	02	17											
Swath Swath	054 054	23:30 00:00		47.09 51.76		07.63 06.90			171 174	7.3 8.4	3571 3662	02 02	17 17											
Swath	055	00:00		52.25		06.84			183	9.4	38002	02	18											
Swath	055			55.60		09.40			225	8.4	4209	03	18											
Swath	055	01:00	03	59.15	12	12.20			223	9.0	4075	03	18											
Swath	055	01:30		02.50		14.90			217	9.3	4272	03	18											
Swath	055	01:59		06.19		17.88			189	8.5	3587	03	19											
Swath Swath	055 055	02:29 03:00		10.55 14.89		17.59 17.26			175 175	8.5 8.5	3164 3016	04 04	19 19										1	
Swath	055	03:30		19.35		16.87			175	8.1	3343	04	19	1					1	1				
Swath	055	04:00		23.71		16.45			175	8.5	3569	04	19	1					1	1				
Swath	055	04:12		25.80		16.79				8.7	3529		20	1					1	1				WP6 eol 4 A/C
Swath	055	04:16		26.07		16.79			216	9.0	3418	05	20										1	O/C sol 5
Swath Swath	055 055	04:30 05:00		27.49 30.79		18.16 21.26			226 220	9.5 9.0	3387 3392	05 05	20 20	1					1	1				
Swath	055	05:30		34.04		24.39			228	9.0	3572	05	20											
Swath	055	05:50		36.55		26.80			228	9.0	3430		20	1					1	1				Course change to sol 6 early
Swath	055	06:00		37.40		26.90			166	9.0	3392	06	21	1					1	1				o/c sol 6
Swath	055	06:24		40.70		26.10			150	9.0	3288	07	22										1	o/c sol 6
Swath Swath	055 055	06:32 07:00		41.78 45.02		25.62 23.71			152 151	9.1 8.1	3363 3296	07 07	22 22	1					1	1				Course alteration eol 6 sol 7
Swath	055	07:00		45.02 48.30		23.71 21.80			165	8.1	3296 2946	07	22										1	a/c to 165
Swath	055			48.80		21.70			165	9.3	2930	08	23	1					1	1				
Swath	055	07:35	04	49.30	12	21.60			195	9.4	2914	09	23	1					1	1				a/c to 195
Swath		07:44				21.90	l	I	180	8.6	3040	10	23				I	l	I	1		I	I	a/c to 180
	CD16 SHIP			nce log tude (S		nitude	140					Swath/ TOBI		тові					Plo	tted Po:		Lo		Comments
	oniP		Lat	uue (S	LOUG	ynude (••)					1001		1 UBI						(111)	Lat	LO		Comments

																							_		
Operation Swath	JD 055	Time 08:00		min 52.90	deg	min 21.90	Dec.Lat	Dec.Lon	184	5MG 7.8	3252	Line 10	# 23	W/o	Alt	z(m)	HDG	Dec.Lat	Dec.Lon	L-bck	Deg.	. Min	Deg	g Min	1
Swath	055	08:10		54.16		22.01			181	7.6	3328	11	23												a/c to 165
Swath	055	08:30		56.70		21.45			164	7.6	3444	11	23												
Swath	055	09:00		00.41		20.40			165	6.8	3345	11	23												
Swath	055	09:30	05	04.12	12	19.46			162	8.1	3311	11	23												END OF SWATH EOL 11
Swath	055	10:00	05	07.85	12	18.54			168	7.8	3454	11	23												Continue line for TOBI deployment
Transit	055	10:07																							Underway to TOBI start
Transit	055	10:20	05	10.50	12	17.80			170	3.5	3658	-													Reducing speed to deploy 10 KHz, 3.5 KHz fish
TOB-01	055	10:30	05	10.80	12	17.80			170	3.5	3632														
TOB-01	055	10:40		11.10		17.80			174	1.5	3467	-													2 Fish in
TOB-01	055	11:00		11.40		17.87			286	1.2	3280	-													
TOB-01	055	11:07																							Bat fish + 1st mapper in (M12)
TOB-01	055	11:13																							2nd mapper in (M13)
TOB-01	055																								3rd mapper in (M6)
TOB-01	055	11:28																							4th mapper in (M29)
TOB-01 TOB-01	055 055	11:50 12:10																		•					TOBI in th water TOBI electronics ok - ready to deploy
TOB-01	055	12:10																							Bomb in water
TOB-01	055	12:23																							5th mapper in (at 0m W/O)
TOB-01	055	12:26																							6th mapper in (at 50m W/O)
TOB-01	055	12:34	05	12.27	12	17.98			151	1.0															
TOB-01	055	12:36	05	12.33	12	17.93																			Commensing turn at 10 degrees per minute
TOB-01	055	12:56		12.00		17.52	5.200	12.292	351	3.7	3281			300		217	357	5.203	12.292	379					TOBI deployed - on course
TOB-01	055	13:00		11.83		17.54	5.197	12.292	337	2.2	3300			462		231	349	5.202	12.291	590					
TOB-01 TOB-01	055 055	13:27 14:00		10.50 09.12		17.63 17.76	5.175 5.152	12.294 12.296	359 356	2.8 2.7	3675 3662			1661 2795		801 1282	355 348	5.190 5.176	12.293 12.291	1645					
TOB-01	055	14:00		09.12		17.90	5.132	12.290	347	3.0	3293			3953		2144	340	5.176	12.291	2674 3511	5	10.00	1	2 17.05	
TOB-01	055	14:48		07.43		18.05	5.124	12.301	331	1.9	3517			0000		2144	000	0.107	12.200	0011	Ĩ		.		Reduced W/O to 20m/min
TOB-01	055	14:55			. –									4837											Stop winch
TOB-01	055	15:01	05	07.05	12	18.15	5.118	12.303	337	2.0	3554			4837		2789	352	5.155	12.297	4142	5	9.40	13	2 17.45	
TOB-01	055	15:20	05	06.23		18.19	5.104	12.303	347	2.0	3501			4837		2637	351	5.142	12.297	4245					TOBI 800m of bottom - sol 12
TOB-01	055	15:30		06.01		18.24	5.100	12.304	350	2.0	3548			4836	850	2632	351	5.138	12.298	4247		8.30		2 17.80	
TOB-01 TOB-01	055 055	16:00 16:30		05.01 04.02		18.51 18.79	5.084 5.067	12.309 12.313	000 357	2.8 1.9	3607 3452	12		4835 5050	765 738	2643 2786	354 354	5.122 5.107	12.304 12.309	4239 4402		7.40 6.45		2 17.90 2 18.20	
TOB-01	055	17:00		04.02 03.09		19.04	5.067	12.313	338	2.0	3452	12		5050 5200	449	2766	354 350	5.092	12.309	4402		5.50		2 18.45	
TOB-01	055	17:30		02.17		19.31	5.036	12.317	343	2.0	3479	12		5158	447	3428	353	5.073	12.317	4044		4.55		2 18.80	
TOB-01	055	18:00		01.27		19.54	5.021	12.326	351	1.7	3534	12		5117	323	3405	353	5.057	12.321	4010		3.50		2 19.00	
TOB-01	055	18:30	05	00.28	12	19.79	5.005	12.330	349	1.9	3615	12		5074	438	3516	354	5.039	12.326	3848	5	2.40	13	2 19.30	
TOB-01	055	18:45	04				4.000																		TOBI glitch, rebooted successfully at 18:55
TOB-01	055	19:00		59.31		20.11	4.989	12.335	334	1.8	3454	12		5146	455	3469	354	5.032	12.331	3991		1.50		2 19.60	
TOB-01 TOB-01	055	19:30		58.29 57.35		20.38	4.972	12.340	345	1.9	3575	12		5353 5474	492 439	3135 3033	350	5.012	12.333	4529 4747		0.80		2 19.75 2 19.90	
TOB-01	055 055	20:00 20:30		57.35 56.36		20.67 20.94	4.956 4.939	12.345 12.349	347 357	1.9 2.2	3466 3552	12 12		5474 5522	439 390	3033	350 348	4.998 4.982	12.337 12.340	4747		0.00 58.80		2 19.90	
TOB-01	055	21:00		55.44		21.20	4.924	12.343	339	2.1	3512	12		5523	369	3122	346	4.966	12.340	4746		57.85		2 20.35	
TOB-01	055	21:05			. –									5523		• ·									Haul 10m/m
TOB-01	055	21:11		1		1								5446	374	[1				1	1		1	Winch stopped
TOB-01	055	21:30	04	54.51	12	21.47	4.909	12.358	338	1.9	3380	12		5446	386	3118	345	4.949	12.347	4655	4	57.25	i 1:	2 20.60	
TOB-01	055	21:37												5446											Haul10m/m
TOB-01	055	21:50		50.07	40	04 74	4 005	40.000	004	4.0	0000	40		5321	400	0000		4 00 4	40.050	4500		50.00			Winch stopped
TOB-01 TOB-01	055 055	22:00 22:15	04	53.67	12	21.71	4.895	12.362	334	1.6	3290	12		5321 5321	406	3082	344	4.934	12.350	4528	4	56.00	1	2 21.00	Haul10m/m
TOB-01	055	22:13												5240											Increase haul to 15 m/m
TOB-01	055	22:30	04	52.83	12	21.93	4.881	12.366	336	2.2	3284	12		5158	303	3061	345	4.919	12.355	4342	4	55.00	1	2 21.20	
TOB-01	055	22:55									-			4743	481		1				1			1	Winch stopped
TOB-01	055	23:00	04	51.82	12	22.20	4.864	12.370	354	2.2	3131	12		4743	521	2781	351	4.900	12.364	4032		54.00		2 21.60	
TOB-01	055	23:30		50.90		22.46	4.848	12.374	338	1.9	3106	12		4744	580	2691	349	4.885		4097		53.20	1:	2 21.80	Veer 5m/m, Increase veer to 10m/m
		9 leg1:		nce log								Swath/		TOP					Plott	ted Pos		ı			0
Operation	SHIP JD	Time		tude (S			(W) Dec.Lat	Declor	CMC	SMC	Donth	TOBI	#	TOBI W/o	A 1+	7(m)	нре	Dec.Lat	Declor	(,	Lat	Min	Loi	n g Min	Comments
TOB-01		23:39			ueg		Dec.Lat	Dec.LON		Sivid	Depth	LIIIG	<i>"</i>	4783		2(11)		Dec.Lat	Dec.LON		Jeg.		Dei		1
		_0.00	1 I	1	. 1	l		•			•	1			•	1		1	•	I	•	•	1	1	1

TOP 01	055	22.50		40.00	1 4 2	22.72	4 0 2 2	10.070	226	1 1 2	3015	1 1 2	i i	4060	467	2706	1 250	4 970	10.070	4240	4 50	00 I	40	22.05	Winch stonned
TOB-01 TOB-01	055 056	23:59 00:30		49.89 48.89		22.73 23.04	4.832 4.815	12.379 12.384	326 356	1.3 1.8	2964	12 12		4962 4910	352	2677	350 349	4.870 4.853	12.372 12.376	4349 4306	4 52. 4 51.			22.05 22.50	Winch stopped WP10 passed
TOB-01	056	01:00		47.87		23.23	4.798	12.387	333	1.8	2994	13		4889	350	2659	347	4.836	12.378	4293	4 50.			23.00	Wi io passed
TOB-01	056	01:00	04	47.07	12	20.20	4.730	12.007	555	1.0	2334	15		4889	550	2000	547	4.000	12.570	4235	4 50.	05	12	23.00	Haul 5m/min
TOB-01	056	01:14												4000											TOBI CTD locked out
TOB-01	056	01:22												4707											Winch stopped
TOB-01	056	01:30	04	46.86	12	23.39	4.781	12.390	334	2.0	3129	13		4707			347	4.816	12.382	3894	4 48.	85	12	22.85	! No TOBI altitude. Layback est'd from past values
TOB-01	056	02:00		45.85		23.60	4.764	12.393	344	2.0	3070	13		4706			354	4.799	12.390	3893	4 47.			23.40	! No TOBI altitude. Layback est'd from past values
TOB-01	056	02:30	04	44.84	12	23.77	4.747	12.396	338	2.0	3220	13		4705			353	4.782	12.392	3892	4 46.	80	12	23.40	! No TOBI altitude. Layback est'd from past values
TOB-01	056	02:45												4705											start veering at 8m/sec
TOB-01	056	02:57												4802											Winch stopped
TOB-01	056	03:00	04	43.86	12	23.97	4.731	12.400	333	2.3	3251	13		4802			355	######	######		4 46.	00	12	23.55	! No TOBI altitude. Layback est'd from past values
TOB-01		03:10																							nephel 0.038
TOB-01	056	03:30	04	42.68	12	24.16	4.711	12.403	347	2.5	3300	13		4964	475	2640	356	4.751	12.400	4394	4 45.	00	12	24.00	
TOB-01	056	04:00	04	41.54	12	24.40	4.692	12.407	329	2.5	3427	13		5458	355	2875	425	4.711	12.446	4829	4 44.		12	23.95	Pay out @ 8
TOB-01	056	04:30	04	40.44	12	24.59	4.674	12.410	357	1.7	3528	13		5597	433	2887	354	4.719	12.405	4985	4 43.	15	12	24.20	veer @ 7
TOB-01	056	05:00		39.37		24.78	4.656	12.413	355	1.9	3583	13		5788	357	3029	356	4.703	12.410	5122	4 41.			24.45	
TOB-01	056	05:30		38.31		25.00	4.639	12.417	335	2.1	3627	13		5787	367	3039	357	4.685	12.414	5115	4 41.			24.40	
TOB-01	056	06:00		37.26		25.20	4.621	12.420	357	1.8	3648	13		5791	421	3057	355	4.667	12.416	5108	4 40.	50	12	24.50	Veer @ 8
TOB-01	056	06:18		36.61		25.31	4.610	12.422	326	2.4	3620	13													turn to WP started: 1°/min. Should take 1 hr to WP.
TOB-01	056	06:30		36.24		25.33	4.604	12.422	347	2.1	3650	13		5748	347	3095	355	4.650	12.418	5034	4 39.			24.60	Haul @ 15. WP11 eol.
TOB-01	056	07:00		35.37		24.94	4.590	12.416	031	1.0	3521			5695	397	3172	357	4.634	12.413	4920	4 38.	-		24.80	Turning
TOB-01	056	07:30	04	34.60	12	24.32	4.577	12.405	031	2.3	3727	14		5648	415	3203	9.4	4.620	12.413	4842	4 36.	85	12	24.95	o/c on line 1, veer @ 8
TOB-01	056	07:39												5648											Winch haul @ 10
TOB-01	056	07:42												5635											Winchstop
TOB-01 TOB-01	056 056	07:47	04	33.79	10	22.40	4 560	12.391	054	2.0	3751	14		5636	460	2422	20.4	4 602	12.413	5025	4 35.	~	40	25.50	Veer @ 8
TOB-01	056	08:00 08:30		33.08		23.48 22.69	4.563 4.551	12.391	054	2.9 2.6	3671	14 14		5761 6020	460 417	3133 3167	28.1 39.3	4.603 4.589	12.413	5025	4 35.			25.00	NB "PlottedPos" = estimated TOBI posn from map
TOB-01	056	08.30	-	32.32		22.09	4.531	12.378	050	2.0	3470	14		6400	417	3232	44	4.576	12.409	5714	4 34.	-		23.00	winch stopped
TOB-01	056	09:30		31.54		20.98	4.526	12.350	049	3.0	3393	14		6401	544	3146	47	4.561	12.388	5765	4 33.			24.40	which stopped
TOB-01	056	10:00		30.73		20.04	4.512	12.334	066	2.0	3395	14		6401	523	3025	51.2	4.545	12.375	5831	4 32.			23.10	
TOB-01	056	10:30		29.89		19.12	4.498	12.319	058	3.1	3455	14		6401	377	2984	53.2		12.361	5853	4 32.			21.80	
TOB-01	056	11:00		29.11		18.24	4.485	12.304	058	2.0	3242	14		6401	367	2954	53.3	4.517	12.347	5869	4 31.			20.15	
TOB-01	056	11:30		28.25		17.28	4.471	12.288	043	3.0	3335	14		6402	506	2943	52.9	4.503	12.331	5875	4 30.			19.50	
TOB-01	056	11:51			. –																				Start turn for WP13 (bridge late informing)
TOB-01	056	11:57	04	27.41	12	16.40	4.457	12.273	038	2.0	3234	14		6402	326	2917	53	4.489	12.316	5889	4 29.	60	12	18.75	Haul at 5m/min
TOB-01	056	12:00												6389											Increase haul to 10m/m
TOB-01	056	12:05												6339											Winch stopped
TOB-01	056	12:25												6339											Veering 5m/min
TOB-01	056	12:30	04	26.04	12	15.97	4.434	12.266	344	2.8	3331	14		6372	567	2871	51.5	4.467	12.308	5879	4 28.	80	12	17.50	
TOB-01	056	12:32												6374											Stopped winch
TOB-01	056	12:46												6374											Haul at 5m/min
TOB-01	056	12:51												6354											Stopped winch
TOB-01	056	13:00		24.78		16.09	4.413	12.268	355	3.2	3450	14		6354	367	2938	38.7		12.301	5824	4 27.			16.80	
TOB-01	056	13:30	04	23.42	12	16.28	4.390	12.271	359	2.5	3450	14		6354	422	2840	17.8	4.441	12.288	5874	4 26.	55	12	16.00	
TOB-01	056	13:38	~ (10	10.15			0.57		0505								10.000						Veering 10m/min
TOB-01	056	14:00	04	22.08	12	16.45	4.368	12.274	357	2.8	3565	14		6643	600	2888	5.8	4.424	12.280	6172	4 25.	40	12	15.80	
TOB-01	056	14:19	04	20.02	10	10.04	4 2 4 7	10.077	252	25	2474	14		0050	270	2050	250	4 406	10.076	6440	4 24	e 0	40	46.00	Winch stopped
TOB-01 TOB-01	056	14:30 15:00		20.83 19.58		16.64 16.79	4.347 4.326	12.277 12.280	352 354	2.5 2.6	3474 3300	14	####	6956 6056	379 420	3050 3065	359	4.406 4.385	12.276 12.279	6442 6434	4 24. 4 23.			16.20 16.30	
TOB-01	056 056	15:22	04	19.50	12	10.79	4.320	12.200	304	2.0	3300	14	### 00	6956 6956	420	3005	359	4.303	12.219	0434	4 23.	10	12	10.30	Haul at 10m/min
TOB-01	056	15:22	04	18.32	12	16.99	4.305	12.283	350	2.5	3200	14	####	6956 6871	440	3053	358	4.363	12.281	6345	4 21.	80	12	16.45	still hauling at 10m/min.
TOB-01	056	16:00		16.96		17.17	4.283	12.286	356	2.5	3153	14	##	6721	371	2966	358	4.339	12.284	6221	4 20.			16.80	
TOB-01	056	16:04	04	. 5.00			4.000	.2.200	000	2.0	0.00			6721	0.1	2000	000						-		Haul @ 5
TOB-01	056	16:14	Ĵ.														1			1					Haul @ 10
TOB-01	056	16:16																							Haul @ 15.
TOB-01	056	16:30	04	15.68	12	17.30	4.261	12.288	000	2.8	3096	14		6459	355	2865	355	4.315	12.284	5979	4 19.	25	12	16.50	
				nce log			• •		•			Swath	<i>'</i>				•	•		ted Pos					
	SHIP	-				gitude (W)					тові		тові						(m)	Lat	L	on		Comments
Operation	JD	Time	deg	min	deg	min	Dec.Lat	Dec.Lon	CMG	SMG	Depth	Line	#	W/o	Alt	z(m)	HDG	Dec.Lat	Dec.Lor	L-bck	Deg. Mir	n D	eg	Min	
TOB-01	056	16:32												6459											haul @ 20
TOB-01	056	16:56															1			1					Haul at 10m/min
TOB-01	056	17:00	04	14.40	12	17.30	4.240	12.288	357	2.7	2954	15		5933	395	2675	356	4.290	12.285	5486	4 17.	40	12	16.80	Stop winch

TOB-01	056	17:05																							Haul at 10m/min
TOB-01	056	17:06																							Haul at 20m/min
TOB-01	056	17:15																							Haul at 10m/min
TOB-01	056	17:30	04	13.31	12	17.31	4.222	12.289	040	1.7	2952	15		5627	411	2684	0.6	4.269	12.289	5136	4 1	6.20	12	16.90	
TOB-01	056	17:31												5627									. –		winch stopped
TOB-01	056	17:34																							Haul at 10m/min
TOB-01	056	17:38																							Haul at 15m/min
TOB-01	056	17:42									2914			5511											winch stopped
TOB-01	056	17:50									2899			5511											Veer at 10
											2899			5537											
TOB-01	056	17:53	~ 4			17.00	4 000	40.000							0.47	0570				5000					winch stopped
TOB-01	056	18:00	04	12.00	12	17.30	4.200	12.288	000	2.0	2925			5537	347	2578	2	4.246	12.290	5090	4 1	5.00	12	17.20	Haul at 10m/min
TOB-01	056	18:21									3060			5321											Haul at 5m/min
TOB-01	056	18:24									3094			5308											winch stopped
TOB-01	056	18:28									3108			5308											veer 10m/min
TOB-01	056	18:30	04	10.77	12	17.31	4.180	12.289	001	2.4	3128	15		5327	461	2467	3.4	4.224	12.291	4911	4 1	3.50	12	17.00	veer 15m/min
TOB-01	056	18:33									3128			5368											Stopped winch
TOB-01	056	18:46									3118			5370											Veer 10m/min
TOB-01	056	18:58									3207			5476											Stopped winch
TOB-01	056	19:00	04	09.47	12	17.27	4.158	12.288	356	1.7	3214	15		5476	395	2505	3.6	4.204	12.291	5059	4 1	2.20	12	17.05	
TOB-01	056	19:11	04				4.000				3324	15		5477											veer 10m/min
TOB-01	056	19:15									3399			5527											veer 15m/min
TOB-01	056	19:20																							Chris changed time delay to 4.5sec on 3.5KHz
TOB-01	056	19:30	04	08.23	12	17.28	4.137	12.288	358	2.3	3470	15		5746	440	2584	2.4	4.186	12.290	5322	4 1	0.50	12	17.05	,
TOB-01	056	19:45									3574			5979											Winch stopped
TOB-01	056	20:00	04	06.95	12	17.22	4.116	12.287	346	2.9	3631	15		5979	363	2657	1.3	4.166	12.288	5546					
TOB-01	056	20:09												5979											veer 15m/min
TOB-01	056	20:17	04	06.22	12	17.27	4.104	12.288	351	2.2	3697	15		6115	515	2688	3.2	4.155	12.291	5683					start turn at w/p 14
TOB-01	056	20:30		05.81		17.18	4.097	12.286	050	1.7	3738	15		6296	449	2848	5.8	4.149	12.291	5805	49	00	12	17.00	veer reduce to 10m/m
TOB-01	056	20:30	04	05.01	12	17.10	4.097	12.200	050	1.7	3130	15		6306	449	2040	5.0	4.149	12.292	3803	4 9	.00	12	17.00	Winch stopped
TOB-01	056	20:32												6306											veer 10m/min
			~ 4	04.00	40	40.50	4.000	40.070	000	0.5	0004	45			440	0007	0.5	4.405	40.070	5044			40	47.00	veer rom/mm
TOB-01	056	21:00		04.89		16.58	4.082	12.276	039	2.5	3801	15		6430	412	3067	2.5	4.135	12.279	5841	48	.00	12	17.00	
TOB-01	056	21:07	04	04.67	12	16.41	4.078	12.274	033	2.2	3895	16		6511	343	3146	4.5	4.131	12.278	5891					
TOB-01	056	21:20												6631											Winch stopped
TOB-01	056	21:30	04	03.99	12	15.91	4.067	12.265	052	2.4	4105	16		6631	302	3264	13.4	4.119	12.278	5962	47	.30	12	16.80	
TOB-01	056	21:52												6631											veer 10m/min
TOB-01	056	22:00	04	03.05	12	15.18	4.051	12.253	052	2.6	4222	16		6714	406	3249	26.5	4.100	12.278	6066	46	.20	12	16.80	
TOB-01	056	22:16												6879											Winch stopped
TOB-01	056	22:30	04	02.18	12	14.48	4.036	12.241	055	3.4	4231	16		6879	396	3325	33.1	4.084	12.272	6212	4 5	.00	12	16.20	
TOB-01	056	22:32												6879											Veer10m/m
TOB-01	056	22:50												7050											Increase veer to15m/m
TOB-01	056	23:00	04	01.22	12	13.72	4.020	12.229	056	3.0	4208	16		7203	637	3446	36.4	4.068	12.264	6515	44	.40	12	16.00	
TOB-01	056	23:15												7422											Decrease veer to 10m/m
TOB-01	056	23:18												7445											Winch stopped
TOB-01	056	23:24										16		7445											Veer 10m/m
TOB-01	056	23:30	04	00.33	12	13.01	4.006	12.217	036	2.5	4272	16		7522	495	3653	39.8	4.053	12.256	6765	43	.20	12	15.50	
TOB-01	056	23:50										1		7692											Winch stopped
TOB-01	057	00:00	03	59.54	12	12.39	3.992	12.207	036	1.8	4311	16		7692	377	3809	41.3	4.039	12.248	6873	4 2	.50	12	14.70	
TOB-01	057	00:26						-				-		7692						-	ſ				Hauling @ 20 m/min
TOB-01	057	00:28																							On board computer crashed
TOB-01	057	00:30	03	58.61	12	11.68	3.977	12.195	047	2.2	4193	16		7604	292		45.4	4.023	12.241	7167					CTD gone, Reboot - All bad: short in umbillical?
TOB-01	057	00:38	00	00.01			0.011	12.100	•						202		.0.1								Hauling for recovery @ 25 m/min. ETA 5AM
TOB-01	057	02:55	03	56.02	12	09.70	3.934	12,162	035	2.3	4310			5428				3.969	12.186	4709					
TOB-01	057	02:00		53.82		08.38	3.897	12.102	012	23.0	4164			3660				3.897	12.100						
TOB-01	057	04:00		52.39		07.52	3.873	12.140	042	1.9	3982			2358				5.037	12.140						
TOB-01	057	04:00		52.39 51.57		07.52	3.860	12.125		1.9	3582			2356											
108-01					12	00.00	3.000	12.110	007	1.1	3002	Sweth (1	1340	I I				Diati	ad Part	Hor	1			I
		e leg l :		nce log tude (S)								Swath/							Plott	ted Posit					0
					u on	UITUDE (VV1					тові		TOBI W/o		-4.	115.4	D	D	(m)		-	Lon		Comments
0	SHIP	T :						Deel	0.40	0.40	Dant				Alt	z(m)	HUG	Dec.Lat	Dec.Lon	L-DCK					
Operation	SHIP JD	Time	deg	min	deg	min	Dec.Lat	Dec.Lon				Line			, ,	• • •	1				eg. iv	···· ·	Jeg	Min	Winch steward @ 4000 min 16 to 11 to
TOB-01	SHIP JD 057	04:56	deg 03		deg		Dec.Lat 3.863	Dec.Lon 12.102	CMG 140	SMG 2.1	Depth 3359	Line		1000		. ,					eg. W	ĺ	Jeg	Min	Winch stopped @ 1000m: await daylight recovery.
TOB-01 TOB-01	SHIP JD 057 057	04:56 05:20	deg 03 03	min 51.76	deg 12	min 06.12	Dec.Lat 3.863 3.000	12.102	140	2.1	3359	Line									Jeg. II		Jeg	Min	Winch stopped @ 1000m: await daylight recovery. 5.5 chart recorder stopped
TOB-01 TOB-01 TOB-01	SHIP JD 057 057 057	04:56 05:20 06:00	deg 03 03 03	min 51.76 53.98	deg 12 12	min 06.12 05.32	Dec.Lat 3.863 3.000 3.900	12.102 12.089	140 162	2.1 1.6	3359 3542	Line		1000									Jey	Min	5.5 chart recorder stopped
TOB-01 TOB-01 TOB-01 TOB-01	SHIP JD 057 057 057 057	04:56 05:20 06:00 06:30	deg 03 03 03 03	min 51.76 53.98 55.03	deg 12 12 12	min 06.12 05.32 04.96	Dec.Lat 3.863 3.000 3.900 3.917	12.102 12.089 12.083	140 162 158	2.1 1.6 2.3	3359 3542 3653	Line		1000 991							Jeg. II		Jeg	Min	
TOB-01 TOB-01 TOB-01	SHIP JD 057 057 057 057	04:56 05:20 06:00	deg 03 03 03 03	min 51.76 53.98 55.03	deg 12 12 12	min 06.12 05.32	Dec.Lat 3.863 3.000 3.900	12.102 12.089	140 162 158	2.1 1.6 2.3	3359 3542	Line		1000							Jeg. II		Jeg	Min	5.5 chart recorder stopped

						i.												i				i de la construcción de la constru
TOB-01	057	07:13																				6th MAPR inboard (M9)
TOB-01	057	07:19																				5th MAPR inboard (M8)
TOB-01	057	07:22																				Depressor weight on deck
TOB-01	057	07:35	03 56.30	12	04.70	3.938	12.078	180	1.7	3458												
TOB-01	057	07:48	03 56.30	12	08.84	3.938	12.147	264	0.5	3466												TOBI on deck
TOB-01	057	08:00	03 56.35	12	04.89	3.939	12.082	222														4th MAPR inboard (M29)
TOB-01	057	08:03																				3rd MAPR inboard (M6)
TOB-01	057	08:07																				2nd MAPR inboard (M13)
TOB-01	057	08:11																				1st MAPR and BAT fish inboard (M12)
108-01	057	00.11																				ISI MAFK and BAT IISII IIDdaid (MIZ)
	0.57					0.050																
Transit	057	08:25	03 57.17		05.64	3.953	12.094	234	10.0													transit to CTD station (2 knots until TOBI is tied up)
Transit	057	09:00	04 00.68		10.62	4.011	12.177	233	12.0	3980												Transit to CTD position (speed up to 9 knots)
Transit	057	09:30	04 03.98		15.52	4.066	12.259	240	11.2	4049												Transit to CTD position
Transit	057	09:39	04 04.47	12	16.01	4.075	12.267															Slowing down
CTD-01	057	09:42	04 04.52	12	16.06	4.075	12.268	281		3910												On station
CTD-01	057	09:54	04 04.60	12	16.18	4.077	12.270	189	0.6	4005												CTD in water
CTD-01	057	10:30	04 04.61	12	16.22	4.077	12.270	232	0.5			1680										Not picking up bottom on bathymetry screen.
CTD-01	057	11:00	04 04.57	12	16.18	4.076	12.270	133	0.2			3382										
CTD-01	057	11:01	04 04.58	12	16.18	4.076	12.270	186	0.2			3384		3500				Depth	- > ca	ble out		Small particle peak. Red = CTD in Db not TOBI in m.
CTD-01	057	11:08	04 04.60		16.19	4.077	12.270		.	4858		3726		3800						ble out		On Bottom- Bottle 1
CTD-01	057	11:15	04 04.60		16.19	4.077	12.270	165	0.2	4858		0.20		0000				2000	Í	1		Winch up 100m
CTD-01	057	11:19	04 04.61		16.19	4.077	12.270	002	0.2	4858		2627		3700				Donth	1	ا الم		Bottle 2
										4000		3627								ble out		
CTD-01	057	11:24	04 04.60		16.21	4.077	12.270	321	0.5			3530		3600						ble out		Bottle 3
CTD-01	057	11:28	04 04.60		16.21	4.077	12.270	146	0.7			3481		3550				•		ble out		Bottle 4
CTD-01	057	11:31	04 04.62		16.20	4.077	12.270	114	0.2			3458		3525						ble out		Bottle 5
CTD-01	057	11:34	04 04.63	12	16.20	4.077	12.270	141	0.6			3432		3500				Depth	> ca	ble out		Bottle 6
CTD-01	057	11:39	04 04.64	12	16.20	4.077	12.270	251	0.1			3408		3475				Depth	> ca	ble out		Bottle 7
CTD-01	057	11:42	04 04.64	12	16.20	4.077	12.270	064	0.0			3383		3450				Depth	> ca	ble out		Bottle 8
CTD-01	057	11:46	04 04.64		16.21	4.077	12.270	072	0.7			3335		3400				Depth	> ca	ble out		Bottle 9
CTD-01	057	11:50	04 04.63	12	16.21	4.077	12.270	357	0.4			3237		3300				Depth				Bottle 10
CTD-01	057	11:54	04 04.63		16.22	4.077	12.270	344	0.4			3140		3200				•		ble out		Bottle 11
CTD-01	057	12:00	04 04.62		16.23	4.077	12.271	184	0.3			2945		3000						ble out		Bottle 12
CTD-01	057	12:00	04 04.65		16.23	4.077	12.271	194	0.0			2700		2750						ble out		Bottle 12
																		•				
CTD-01	057	12:17	04 04.70		16.23	4.078	12.271	101	0.7			2457		2500						ble out		Bottle 14
CTD-01	057	12:25	04 04.69		16.26	4.078	12.271		1.1			2204		2250						ble out		Bottle15
CTD-01	057	12:35	04 04.66		12.27	4.078	12.205		0.2			1970		2003				Depth	> ca	ble out		Bottles 16-24
CTD-01	057	13:15	04 04.81		16.29	4.080	12.272															CTD on deck
CTD-01	057	13:53	04 05.15	12	16.40	4.086	12.273															
TOBI TEST	057	13:53	04 05.10	12	16.40	4.085	12.273															hove to
TOBI TEST	057	14:08	04 05.50	12	16.40	4.092	12.273															umbilical streaming test
																						SAPS weight in water
Transit	057	14:28	04			4.000																test end
Transit	057	15:02	04 10.80	12	17.50	4.180	12.292	198	4.9	4076												
RC-01	057	15:10	04 11.10	12	17.40	4.185	12.290			3055									1	1		On station RC01.Hove to.s
RC-01	057	16:02	04 11.10		17.40	4.185	12.290			3055									1	1		
RC-01			5411.10	1 2	17.40	4.100	12.230	200	15	5055								1	1	1		Chinner in water
	057	16:05		1	47 50	4.405	40.000	300	1.5									1	1	1		Chipper in water
RC-01	057	16:10	04 11.10		17.50	4.185	12.292															MAPR in water
RC-01	057	16:30	04 11.11		17.70	4.185	12.295											1	1	1		
RC-01	057	17:10	04 11.31	12	18.05	4.189	12.301			3131		3235										Chipper on bottom. Start recovery
RC-01	057	17:52	04	1	1	4.000	I			1									1	1		Stop recovery. Winch problem.
		•	science lo	•							Swath/						Plott	ed Pos	ition	า		
			Latitude (S]Lor	gitude ((W)					TOBI	TOBI						(m)	Lat		Lon	Comments
	SHIP		dea min	deg	min	Dec.Lat	Dec.Lon	CMG	SMG	Depth	Line #	W/o	Alt	z(m)	HDG	Dec.Lat	Dec.Lon	L-bck	Эeg	. Min	Deg Min	
Operation		Time	acginni							3142		1215		. ,					1	1	1 1	Restart winch. Continue recovery
Operation RC-01		Time 18:05	04 11.70	12	18.40	4.195	12.307												1	1	1 1	
RC-01	JD 057	18:05	04 11.70																			MAPR on deck
RC-01 RC-01	JD 057 057	18:05 18:25	04 11.70 04 11.70	12	18.50	4.195	12.008	272	11	3111												MAPR on deck
RC-01	JD 057	18:05	04 11.70	12				272	1.1	3111												MAPR on deck RC01 on deck
RC-01 RC-01 RC-01	JD 057 057 057	18:05 18:25 18:30	04 11.70 04 11.70	12	18.50	4.195	12.008	272	1.1	3111												RC01 on deck
RC-01 RC-01 RC-01 Transit	JD 057 057 057 057	18:05 18:25 18:30 18:32	04 11.70 04 11.70 04 11.65	12 12	18.50 18.56	4.195 4.194	12.008 12.309															
RC-01 RC-01 RC-01 Transit Transit	JD 057 057 057 057	18:05 18:25 18:30 18:32 19:25	04 11.70 04 11.70 04 11.65 04 08.90	12 12 12	18.50 18.56 17.40	4.195 4.194 4.148	12.008 12.309 12.290	019	8.9	3387												RC01 on deck
RC-01 RC-01 RC-01 Transit	JD 057 057 057 057	18:05 18:25 18:30 18:32 19:25	04 11.70 04 11.70 04 11.65	12 12 12	18.50 18.56	4.195 4.194 4.148	12.008 12.309	019		3387												RC01 on deck

																							1
Transit	057	20:04		05.63		19.50	4.094	12.325	154	1.1													End of transit - hove-to
Transit	057	20:30	04 0	05.91	12	19.60	4.099	12.327	194	1.1													hove-to
Transit	057	20:47	04 0	06.09	12	19.50	4.102	12.325	085	4.4													transit to CTD 02
Transit	057	21:00		05.13		18.29	4.086	12.305	044	10.0													transit to CTD 02
Transit	057	21:30		01.95		14.95	4.033	12.249	044	10.0													transit to CTD 02
Transit	007	21.00	040	71.50	12	14.50	4.000	12.245	044	10.0													
CTD-02	057	04.45	04 0	0.04	40	13.10	4.005	12.218	129	0.5	4222												On station
		21:45									4222												On station
CTD-02	057	21:56		00.34		13.08	4.006	12.218	161	0.5													
CTD-02	057	22:30	04 0	00.34	12	13.05	4.006	12.218	082	0.2			1670										
CTD-02	057	23:00																					3295db/3250m - peak in transmisometer
CTD-02	057	23:02											4120										3400m - another peak in transmisometer
CTD-02	057	23:17											4120		4140				Depth	> cab	le out		bottles 1+2
CTD-02	057	23:25											3980		4000				Depth				bottles 3 + 4
CTD-02	057	23:35											3780		3800				Depth				bottles 5+6
CTD-02	057	23:42											3580		3600				Depth				bottles 7 + 8
CTD-02	057	23:48											3482		3500				Depth				bottles 9 + 10
CTD-02	057	23:54											3382		3400				Depth	> cab	le out		bottles 11 + 12
CTD-02	058	00:00											3282		3300				Depth	> cab	le out		bottles 13 + 14
CTD-02	058	00:04											3183		3200				Depth	> cab	le out		bottles 15 + 16
CTD-02	058	00:10											3084		3100				Depth				bottles 17 + 18
CTD-02	058	00:16											2984		3000				Depth				bottles 19 + 20
CTD-02	058	00:29											2486		2500				Depth				bottles 21 + 22
CTD-02	058	00:43											1987		2000				Depth	> cab	le out		bottles 23 + 24
CTD-02	058	01:27	04 0	00.31	12	13.13	4.005	12.219					0		0				190				CTD on deck
Transit	058	01:33	04 0	00.40	12	13.11	4.007	12.219	207	4.0	4241												Transit to RC02
RC-02	058	02:25	04 0	05.98	12	18.12	4.100	12.302	150	0.4	3527												on station RC02
RC-02	058	02:45											0										RC02 in water
RC-02	058	02:47	04 0	06.07	12	18.13	4.101	12.302			3537		20										MAPR13 in water
RC-02	058	03:56		06.10		18.10	4.102	12.302			3535		3689										Chipper on bottom
RC-02	058	04:01		06.17		18.14	4.102	12.302			0000		0000										Hauling in
RC-02	058	04:01		06.45		17.89	4.103				3524		0										
RC-02	056	04,55	04 0	06.45	12	17.09	4.106	12.298			3524		0										Chipper on deck. Small sediment sample.
Transit	058	05:30	04	06.30	12	18.18	4.105	12.303	192	5.0	3589												transit to RC03
Transit	036	05.50	04	0.30	12	10.10	4.105	12.303	192	5.0	3009												
RC-03	058	06:05	04	08.70	12	18.18	4.145	12.303	116	1.0													On station RC03. Positioning ship.
			04 0	0.70	12	10.10		12.303	110	1.0	0004												•
RC-03	058	06:11	-				4.000				3331												Wire paying out. MAPR 13 on wire
RC-03	058	06:30		08.70		18.11	4.145	12.302			3320		1209										
RC-03	058	07:05	04 0	08.70	12	18.11	4.145	12.302			3304		3205										Wire paying out.
RC-03	058	07:11	04 0	08.70	12	18.11	4.145	12.302			3350		3470										Chipper on bottom. Start recovery
RC-03	058	07:14																					Start chipper recovery. Hauling.
RC-03	058	07:32	04	08.70	12	18.00	4.145	12.300			3312		1958										Recovering chipper.
RC-03	058	08:00		08.57		18.02	4.143	12.300			3331		15										MAPR on-board
	058	08:04	040	0.57	12	10.02	4.145	12.300			5551		-7						Donth				
RC-03	000	00.04				1			1				-7						Depth		ie out		Chipper on-board
T	050	00.45			40	17.00	4 4 40	10.000	170	10.5	2224												Transit to BC04
Transit	058	08:15		08.96		17.96	4.149	12.299	170	10.5	3324			1						1 1			Transit to RC04
Transit	058	08:30	04 1	1.09	12	17.65	4.185	12.294	169	9.7	3060												Transit to RC04
	1																						
RC-04	058	08:52	04 1	3.88	12	17.18	4.231	12.286	170	0.2	2900												On station RC04
RC-04	058	08:57							1				20										Chiiper wet
		59 leg1:	scien	ce log	-		•		•			Swath/		•				Plot	ed Pos	ition		• •	
	SHIP					gitude (W)					TOBI	тові							Lat		Lon	Comments
Oneration		Time			-			Dec.Lon	CMG	SMG	Denth		W/o	Δl+	z(m)	HDG	Dec.Lat	Declor			Min	Deg Min	··· ···
			l		aeg				1	5	2950		1,0	ı ``` ı	2(11)	1 1		530.LUI		-eg.			MAPR wet
Operation	JD	00.04											100-										
RC-04	058	09:01						1	1		2970		1895										wire paying out
RC-04 RC-04	058 058	09:30									2962		3032	1									
RC-04 RC-04 RC-04	058 058 058	09:30 09:43																					Chipper on bottom
RC-04 RC-04	058 058	09:30									2957		3019										Chipper on bottom raise chipper - stead for second impact
RC-04 RC-04 RC-04	058 058 058	09:30 09:43																					
RC-04 RC-04 RC-04 RC-04	058 058 058 058	09:30 09:43 09:44									2957		3019										raise chipper - stead for second impact chipper on bottom, again - recovering
RC-04 RC-04 RC-04 RC-04 RC-04 RC-04	058 058 058 058 058 058	09:30 09:43 09:44 09:45 10:00									2957 2948		3019 3032										raise chipper - stead for second impact chipper on bottom, again - recovering Recovering chipper.
RC-04 RC-04 RC-04 RC-04 RC-04 RC-04 RC-04	058 058 058 058 058 058 058	09:30 09:43 09:44 09:45 10:00 10:28									2957 2948		3019 3032										raise chipper - stead for second impact chipper on bottom, again - recovering Recovering chipper. MAPR on board
RC-04 RC-04 RC-04 RC-04 RC-04 RC-04	058 058 058 058 058 058	09:30 09:43 09:44 09:45 10:00									2957 2948		3019 3032										raise chipper - stead for second impact chipper on bottom, again - recovering Recovering chipper.
RC-04 RC-04 RC-04 RC-04 RC-04 RC-04 RC-04	058 058 058 058 058 058 058	09:30 09:43 09:44 09:45 10:00 10:28									2957 2948		3019 3032										raise chipper - stead for second impact chipper on bottom, again - recovering Recovering chipper. MAPR on board

			_																_						_
Transit	058	10:40	-	13.77		17.06	4.230	12.284	070	2.0															Transit to TOBI station 2
Transit	058	11:00		11.65		17.60	4.194	12.293	340	10.4	2979														
Transit	058	11:30		11.84		19.19	4.197	12.320	345	10.7	3615														
Transit Transit	058 058	11:45 12:00		05.50 05.22		19.26 19.24	4.092 4.087	12.321 12.321	127 106	0.7 0.3	3656 3658														On station for TOBI2. Waiting for TOBI to be ready.
Transit	058	12:00		05.51		19.24	4.087	12.321	274	0.5	3672														Waiting for TOBI
Transit	058	12:53	04	00.01	12	10.07	4.002	12.020	214	0.0	0072														TOBI ready for deployment
Transit	058	13:02	04	05.49	12	19.56	4.092	12.326	185	0.9	3658														Preparing TOBI
TOB-02	058	13:14																							1st MAPR - M12 on + Batfish in
TOB-02	058	13:19																							2nd MAPR - M13 on
TOB-02	058	13:24																							3rd MAPR - M6 on
TOB-02	058	13:29																							4th MAPR - M29 on
TOB-02	058	13:50																							TOBI in water
TOB-02 TOB-02	058 058	14:12 14:16																							depressor weight in water 5th MAPR - M8 in
TOB-02 TOB-02	058	14:10																							6th MAPR - M9 in
TOB-02	058	14:30	04	06.22	12	19.45	4.104	12.324	176	1.5	3540	17		315		147	131	4.101	12.327	469					Veering 50m/min
TOB-02	058	14:35	0.	00.22				12.021			00.0			0.0					12:021						Reduce veering to 40m/min
TOB-02	058	15:00	04	06.53	12	18.60	4.109	12.310	074	2.1	3537	17		1448		909	106	4.106	12.322	1317					
TOB-02	058	15:30	04	05.82	12	17.73	4.097	12.296	061	2.0	3541	17		2714		1656	59	4.108	12.314	2340					
TOB-02	058	16:00	04	04.98	12	17.03	4.083	12.284	043	2.5	3725	17		3826		2154	52.3	4.102	12.308	3352					
TOB-02	058	16:20																							Restart 3.5kHz recording, roll 2.
TOB-02	058	16:30		04.09	12	16.32	4.068	12.272	022	2.2	3976	17		5020	967	2746	50.2	4.094	12.303	4392	4	6.20	12	17.80	
TOB-02	058	16:45	04	00.00	40	45 70	4.000	40.000	005	4.0	4470	47		5571		3069				4839		5.00	40	47 40	veer to 10
TOB-02 TOB-02	058 058	16:58 17:09	04	03.33	12	15.73	4.056	12.262	025	1.6	4179 4001	17 17		5700 5865		3176 3262				4923 5064	4	5.60	12	17.40	veer to 15m/min winch stopped
TOB-02	058	17:16									4001	17		5866		3295				5043					veer to 10, LSS > 33
TOB-02	058	17:18									4140	17		5891		3292				5075					veer to 15m/min
TOB-02	058	17:30	04	02.60	12	15.08	4.043	12.251	042	1.6	4250	17		6062	469	3345	47.1	4.076	12.286	5246	4	4.90	12	16.95	
TOB-02	058	17:42	04				4.000				4267	17		6253	415	3464				5396					winch stopped
TOB-02	058	17:45										17		6253	357	3494				5376					haul 10m/min
TOB-02	058	17:47										17		6235	300	3501				5349					haul 20m/min
TOB-02	058	17:49										17		6180	262	3499				5284					nephels .035040
TOB-02	058	17:51										17		6130	350	3479				5237					Haul 10m/m
TOB-02 TOB-02	058	17:55										17 17		6099	382	3441				5226 5235					winch stopped
TOB-02 TOB-02	058 058	17:56 17:58										17		6100 6118	357 545	3429 3424				5255					veer 10m/min veer 15m/min
TOB-02	058	18:00	04	01.88	12	14.51	4.031	12.242	062	2.0	4249	17		6141	546	3424	45	4.065	12.276	5287	4	4.20	12	16.25	LSS 0.038
TOB-02	058	18:30	-	01.10		13.90	4.018	12.232	035	1.3	4327	17		6585	490	3656	44	4.055	12.267	5667		3.25		15.70	200 0.000
TOB-02	058	18:45												6794	420	3765				5845					
TOB-02	058	18:57												6797	397	3762				5851					veer 10m/min
TOB-02	058	19:00	04	60.30	12	13.23	5.005	12.221	037	2.0	4284	17		6827	479	3747	44.3	5.043	12.258	5897	4	2.60	12	15.30	
TOB-02	058	19:26												7085	413	3827				6152					winch stopped
TOB-02	058	19:30		59.56		12.57	3.993	12.210	020	2.2	4245	17		7086	385	3833	44.6	4.032	12.249	6150		20.20		15.00	
TOB-02	058	20:00		58.77		11.92	3.980	12.199	028	2.7	4111	17		7086	412	3757	44.5	4.020	12.238	6198		1.40		14.00	
TOB-02 TOB-02	058 058	20:30 21:00		57.98 57.19		11.31 10.61	3.966 3.953	12.189 12.177	060 023	2.9 2.6	4334 4455	17 17		7086 7086	458 494	3721 3693	44 44.1	4.007 3.994	12.228 12.216	6220 6238		0.40 59.90		13.80 12.90	
TOB-02 TOB-02	058	21:00	03	57.19	12	10.61	3.955	12.177	023	2.0	4455	17		7086	494	3093	44.1	3.994	12.210	0230	3	59.90	12	12.90	Haul 10m/m
100-02		9 leg1:	l scie	l Ince loc			1	I			l	Swath/		1000					Plot	ted Posi	l ition			1	
	SHIP			-		gitude ((W)					TOBI		тові						(m)			Lon		Comments
Operation	JD	Time				min		Dec.Lon	CMG	SMG	Depth	Line	#	W/o	Alt	z(m)	HDG	Dec.Lat	Dec.Lor			Min	Deg	Min	
TOB-02	058	21:20												7002											Winch stopped
TOB-02	058	21:25	03	56.50	12	10.00	3.942	12.167	026	1.9	4348	17		7002											A/C for WP15
TOB-02	058	21:30	03	56.30	12	09.90	3.938	12.165	026	3.0	4406	18		7002	484	3547	44.5	3.979	12.205	6227	3	58.00	12	11.10	on line 18
TOB-02	058	21:54			l			40						7002					10.10						Veer at 10 m/m
TOB-02	058	22:00	03	55.37	12	09.33	3.923	12.156	044	2.6	4209	18		7059	765	3524	44.4	3.964	12.196	6306	3	58.20	12	11.50	nephels 0.038
TOB-02 TOB-02	058	22:20	00	54 44	40	00 75	2 007	12 1 40	057	2.2	4140	10		7243	697	2670	40.2	2 052	12 105	6647	-	57 20	40	10.00	Increase veer to15m/m
TOB-02 TOB-02	058 058	22:30 22:40	03	54.44	12	08.75	3.907	12.146	057	2.3	4140	18		7404 7549	697	3676	40.3	3.953	12.185	6617	3	57.30	12	10.90	Winch stopped
TOB-02 TOB-02	058	22:40												7549 7549											veer 10m/min
TOB-02	058	23:00	03	53.46	12	08.15	3.891	12.136	027	2.6	4103	18		7662	586	3772	41.1	3.938	12.177	6859	3	57.00	12	10.30	
TOB-02	058									2.0				7733				2.300			ľ				Winch stopped
				•	•		•	•	•			•								•	•	•			1 CONTRACTOR OF CO

											i												1
TOB-02	058	23:30	03	52.55	12	07.59	3.876	12.127	053	2.2	3993	18	773		3828	38.9	3.925	12.166	6909	3 55.90	12	9.80	Haul 10m/m
TOB-02	058	23:36											76	4									Increase haul to 15m/m
TOB-02	058	23:50	03	51.93	12	07.21	3.866	12.120	055	2.5	3888	18	74	6									A/C for W/P 16
TOB-02	059	00:00	03	51.59	12	07.06	3.860	12.118	033	2.6	3806	19	720	0 399	3624	37	3.907	12.153	6481	3 54.70	12	8.90	
TOB-02	059	00:12						-		-	4216		703			-							reduce to 10m/min
TOB-02	059	00:15	03	50.93	12	07.98	3.849	12.133	350	2.5	4206		70		3483	36.7	3.895	12.167	6277	3 53.68	12	10.03	stop hauling
TOB-02	059	00:29		50.42		07.06	3.840	12.118	337	2.4	3601	19	70		3509	35.9	3.886	12.107	6262	3 53.70		8.30	stop hadning
		00:35	03	50.42	12	07.00	3.040	12.110	557	2.4	3001	15	-		5505	55.5	3.000	12.101	0202	5 55.70	12	0.50	Haul 10 m/min
TOB-02	059												70										Haul 10 m/min
TOB-02	059	00:40											694										Haul 20 m/min
TOB-02	059	00:50											673	8									stop hauling
TOB-02	059	01:00	03	49.20	12	07.23	3.820	12.121	354	2.5	3300	19	673	8 563	3338	26	3.869	12.145	6032	3 52.50	12	7.80	
TOB-02	059	01:15											673	8									Veer at 10 m/min
TOB-02	059	01:25											68	1									
TOB-02	059	01:29	03	48.03	12	07.42	3.801	12.124	345	2.4	3548	19	68	1 510	3308	11.6	3.855	12.135	6155	3 41.30	12	7.30	
TOB-02	059	01:39											68							-			Haul 10 m/min
TOB-02	059	02:00	02	46.81	12	07.61	3.780	12.127	347	2.0	3556	19	663		3103	1.4	3.835	12.128	6050	3 50.10	12	7.00	
			03	40.01	12	07.01	3.760	12.127	347	2.0	3000	19			3103	1.4	3.035	12.120	0050	3 30.10	12	7.00	
TOB-02	059	02:08											65										Winch stopped
TOB-02	059	02:30	03	45.57	12	07.80	3.760	12.130	330	2.5	3380	19	65		3004	358	3.814	12.128	6016	3 48.80	12	7.10	
TOB-02	059	02:51											65	5									Veering at 10m/min
TOB-02	059	03:00	03	44.37	12	07.97	3.740	12.133	347	2.2	3545	19	664	5 429	3014	358	3.795	12.131	6112	3 47.80	12	7.40	
TOB-02	059	03:02											666	1									Stopped winch
TOB-02	059	03:14											66	1									Veering at 10m/min
TOB-02	059	03:30	03	43.01	12	08.18	3.717	12.136	351	2.5	3490	19	68		3024	358	3.774	12.134	6314	3 46.30	12	7.70	
TOB-02	059	03:31	00	.0.01		00.10	0.7 17	12.100		2.0	0.00		68		0021	000	0.771			0.000			Veering at 20 m/min
														-									
TOB-02	059	03:42											70										Stopped winch
TOB-02	059	03:45											70										Hauling @ 15 m/min
TOB-02	059	03:46											70	0									Increase hauling to 25 m/min
TOB-02	059	03:58	03		12		3.000	12.000					680	6									Stopped winch
TOB-02	059	04:00	03	41.71	12	08.40	3.695	12.140	001	2.5	3500	19	680	6 500	2981	356	3.752	12.136	6308	3 45.00	12	8.00	
TOB-02	059	04:04											68	7 564	2980	358	#######	######	6332				veer 15m/min
TOB-02	059	04:26											710										winch stopped
TOB-02	059	04:30	03	40.44	12	08.55	3.674	12.143	355	2.8	3500	19	710		3130	358	3.734	12.140	6634	3 43.90	12	8.25	
TOB-02	059	04:48	00	40.44	12	00.00	0.074	12.140	000	2.0	0000	10	710		0100	000	0.704	12.140	0004	0 -0.00		0.20	Engine speed dropped 5rpm
																							• • • •
TOB-02	059	04:56											710	4 460									haul at 5m/min
TOB-02	059	05:00	03	39.32	12	08.80	3.655	12.147	332	1.2	3542	19	714		3189	359	3.715	12.146	6586	3 42.90	12	8.30	
TOB-02 TOB-02	059 059	05:00 05:02	03	39.32	12	08.80	3.655	12.147	332	1.2	3542	19	713	9	3189	359	3.715	12.146	6586	3 42.90	12	8.30	haul at 15m/min
			03	39.32	12	08.80	3.655	12.147	332	1.2	3542	19		9	3189	359	3.715	12.146	6586	3 42.90	12	8.30	haul at 15m/min Haul at 20m/min, engine speed back up by 5 rpm
TOB-02	059	05:02	03	39.32	12	08.80	3.655	12.147	332	1.2	3542	19	713	9 3	3189	359	3.715	12.146	6586	3 42.90	12	8.30	
TOB-02 TOB-02	059 059	05:02 05:03	03	39.32	12	08.80	3.655	12.147	332	1.2	3542	19	71: 71:	9 3 0	3189	359	3.715	12.146	6586	3 42.90	12	8.30	Haul at 20m/min, engine speed back up by 5 rpm
TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 059	05:02 05:03 05:09 05:12	03	39.32	12	08.80	3.655	12.147	332	1.2	3542	19	71: 71: 70: 69 [:]	9 3 0 7	3189	359	3.715	12.146	6586	3 42.90	12	8.30	Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min Haul at 10m/min
TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 059 059	05:02 05:03 05:09 05:12 05:14											71: 71: 700 69 ⁻ 689	9 3 0 7 4									Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min
TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 059 059 059	05:02 05:03 05:09 05:12 05:14 05:30		39.32 38.14		08.80	3.655 3.636	12.147 12.149	332 328	1.2	3542 3530	19 19	713 712 700 69 689 689	9 3 0 7 4 4 394	3189 3186	359 394	3.715 3.683	12.146	6586 6304	3 42.90 3 41.80		8.30 8.20	Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min Haul at 10m/min winch stopped
TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 059 059 059 059	05:02 05:03 05:09 05:12 05:14 05:30 05:46											71: 71: 70: 69: 68: 68: 68:	9 3 0 7 4 4 394 4									Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min Haul at 10m/min
TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 059 059 059 059 059	05:02 05:03 05:09 05:12 05:14 05:30 05:46 05:47											71: 71: 700 69 689 689 689 689 689	9 3 0 7 4 4 394 4 0									Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min Haul at 10m/min winch stopped haul 20m/min
TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 059 059 059 059 059	05:02 05:03 05:09 05:12 05:14 05:30 05:46 05:47 05:55											71: 71: 700 69 689 689 689 689 689 689 689	9 3 7 4 4 394 4 7									Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min Haul at 10m/min winch stopped haul 20m/min Iss>0.038, haul 10m/min
TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 059 059 059 059 059 059	05:02 05:03 05:09 05:12 05:14 05:30 05:46 05:47 05:55 05:58	03	38.14	12	08.91	3.636	12.149	328	2.2	3530	19	71: 71: 700 69 689 689 689 689 689 689 689 669 669	9 3 7 4 4 394 4 0 7 7	3186	394	3.683	12.181	6304	3 41.80	12	8.20	Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min Haul at 10m/min winch stopped haul 20m/min
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TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 059 059 059 059 059 059 059	05:02 05:03 05:09 05:12 05:14 05:30 05:47 05:55 05:58 06:00 06:12 9 leg1: Time 06:15 06:24 06:28 06:31	03 03 scie Lati	38.14 36.89 ince lo	12 12 5)Lon deg	08.91 09.14 gitude (3.636 3.615 W)	12.149 12.152	328 252	2.2	3530 3598	19 19 Swath/ TOBI	71: 70: 69 68: 68: 68: 66: 66: 66: 66: 70 # WX 66: 66: 66: 66: 66: 70 80: 80: 80: 80: 80: 80: 80: 80: 80: 80	9 3 0 7 4 4 3 9 7 7 4 0 7 7 4 0 7 7 4 0 7 7 4 0 7 7 4 0 7 7 4 0 7 4 1 1 5 5 5 8 8 5 8 8 8 5 8 8 8 5 8 8 8 8 8 8 8 8 8 8 8 8 8	3186 3088 z(m)	394 359	3.683 3.670	12.181 12.151 Plot	6304 6110 ted Posi (m) 1 L-bck	3 41.80 3 40.50 ition Lat	12 12 Lon Deg	8.20 8.25	Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min Haul at 10m/min winch stopped haul 20m/min Iss>0.038, haul 10m/min winch stopped haul 10 Comments winch stopped veer 10m/min veer 15m/min
TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 059 059 059 059 059 059 059	05:02 05:03 05:09 05:12 05:14 05:30 05:46 05:47 05:55 05:58 06:00 06:12 9 leg1: Time 06:15 06:24 06:28	03 03 scie Lati	38.14 36.89 nce lo itude (\$	12 12 5)Lon deg	08.91 09.14 gitude (min	3.636 3.615 W) Dec.Lat	12.149 12.152 Dec.Lon	328 252 CMG	2.2 2.2 SMG	3530 3598 Depth	19 19 Swath/ TOBI Line	71: 700 699 683 683 684 683 684 665 665 665 TO # W / 0 665 665 665 665 665 665 665	9 3 0 7 4 4 3 9 7 7 4 0 7 7 4 0 7 7 4 0 7 7 4 0 7 7 4 0 7 7 4 0 7 4 1 1 5 5 5 8 8 5 8 8 8 5 8 8 8 5 8 8 8 8 8 8 8 8 8 8 8 8 8	3186 3088 z(m)	394 359 HDG	3.683 3.670 Dec.Lat	12.181 12.151 Plott Dec.Lor	6304 6110 ted Posi (m) 1 L-bck	3 41.80 3 40.50 ition Lat Deg. Min	12 12 Lon Deg	8.20 8.25 Min	Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min Haul at 10m/min winch stopped haul 20m/min Iss>0.038, haul 10m/min winch stopped haul 10 Comments winch stopped yeer 10m/min
TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 059 059 059 059 059 059 059	05:02 05:03 05:09 05:12 05:14 05:30 05:47 05:55 05:58 06:00 06:12 9 leg1: Time 06:15 06:24 06:28 06:31	03 03 scie Lati	38.14 36.89 nce lo itude (\$	12 12 5)Lon deg	08.91 09.14 gitude (min	3.636 3.615 W) Dec.Lat	12.149 12.152 Dec.Lon	328 252 CMG	2.2 2.2 SMG	3530 3598 Depth	19 19 Swath/ TOBI Line	71: 70: 69 68: 68: 68: 66: 66: 66: 66: 70 # WX 66: 66: 66: 66: 66: 70 80: 80: 80: 80: 80: 80: 80: 80: 80: 80	9 3 0 7 4 4 3 9 7 7 7 7 7 4 0 7 7 7 7 4 0 6 8 1 1 1 5 8 8 5 08 7	3186 3088 z(m)	394 359 HDG	3.683 3.670 Dec.Lat	12.181 12.151 Plott Dec.Lor	6304 6110 ted Posi (m) 1 L-bck	3 41.80 3 40.50 ition Lat Deg. Min	12 12 Lon Deg	8.20 8.25 Min	Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min Haul at 10m/min winch stopped haul 20m/min Iss>0.038, haul 10m/min winch stopped haul 10 Comments winch stopped veer 10m/min veer 15m/min
TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 059 059 059 059 059 059 059	05:02 05:03 05:09 05:12 05:14 05:30 05:46 05:47 05:55 05:58 06:00 06:12 9 leg1: Time 06:15 06:24 06:28 06:35 06:58	03 scie Lati deg	38.14 36.89 nnce lo itude (f min 35.54	12 12 35)Lon deg	08.91 09.14 gitude (min 09.27	3.636 3.615 W) Dec.Lat	12.149 12.152 Dec.Lon 12.155	328 252 CMG 017	2.2 2.2 SMG	3530 3598 Depth	19 19 Swath/ TOBI Line	71: 70: 69 68: 68: 68: 66: 66: 66: 66: 66: 66: 66:	9 9 3 0 7 4 4 394 4 394 4 0 0 7 7 7 7 406 3 1 1 1 5 5 8 508 7 7 7	3186 3088 z(m) 3046	394 359 HDG	3.683 3.670 Dec.Lat 3.649	12.181 12.151 Plott Dec.Lor 12.154	6304 6110 ted Posi (m) L-bck 6200	3 41.80 3 40.50 ition Lat Deg. Min	12 12 Lon Deg	8.20 8.25 Min	Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min Haul at 10m/min winch stopped haul 20m/min Iss>0.038, haul 10m/min winch stopped haul 10 Comments winch stopped veer 10m/min veer 15m/min At WP 17, winch stopped
TOB-02 TOB-02	059 059 059 059 059 059 059 059 059 059	05:02 05:03 05:09 05:14 05:30 05:46 05:58 05:58 06:00 06:12 9 leg1: Time 06:15 06:24 06:28 06:35 06:38 06:35	03 scie Lati deg	38.14 36.89 nce lo itude (\$	12 12 35)Lon deg	08.91 09.14 gitude (min	3.636 3.615 W) Dec.Lat 3.592	12.149 12.152 Dec.Lon	328 252 CMG	2.2 2.2 SMG 2.9	3530 3598 Depth 3566	19 19 Swath/ TOBI Line 19	71: 70: 69: 68: 66: 66: 66: 66: 66: 66: 66: 66: 66	9 9 4 3 3 4 3 9 4 4 4 4 4 4 4 4 4 4 4 4	3186 3088 z(m) 3046	394 359 HDG 359	3.683 3.670 Dec.Lat	12.181 12.151 Plott Dec.Lor	6304 6110 ted Posi (m) L-bck 6200	3 41.80 3 40.50 ition Lat Deg. Min 3 39.25	12 12 Lon Deg	8.20 8.25 Min 8.80	Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min Haul at 10m/min winch stopped haul 20m/min Iss>0.038, haul 10m/min winch stopped haul 10 Comments winch stopped veer 10m/min veer 15m/min At WP 17, winch stopped haul 15m/min haul 20m/min
TOB-02 TOB-02	059 059 059 059 059 059 059 059 059 059	05:02 05:03 05:09 05:14 05:30 05:46 05:58 05:58 06:00 06:12 9 leg1: Time 06:15 06:24 06:28 06:28 06:31 06:35 06:58 06:58	03 scie Lati deg	38.14 36.89 nnce lo itude (f min 35.54	12 12 35)Lon deg	08.91 09.14 gitude (min 09.27	3.636 3.615 W) Dec.Lat 3.592	12.149 12.152 Dec.Lon 12.155	328 252 CMG 017	2.2 2.2 SMG 2.9	3530 3598 Depth 3566	19 19 Swath/ TOBI Line 19	71: 71: 700 699 688 668 668 666 666 666 666 666 666	9 9 9 7 7 4 394 4 4 0 7 7 4 4 394 4 4 0 7 7 7 7 7 7 4 0 6 31 1 1 1 5 5 8 7 5 0 8 7 7 7 7 2 2 933 7 7 7 2 2 93	3186 3088 z(m) 3046	394 359 HDG 359	3.683 3.670 Dec.Lat 3.649	12.181 12.151 Plott Dec.Lor 12.154	6304 6110 ted Posi (m) L-bck 6200	3 41.80 3 40.50 ition Lat Deg. Min 3 39.25	12 12 Lon Deg	8.20 8.25 Min 8.80	Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min Haul at 10m/min winch stopped haul 20m/min Iss>0.038, haul 10m/min winch stopped haul 10 Comments winch stopped veer 10m/min veer 15m/min At WP 17, winch stopped haul 15m/min haul 20m/min haul 25m/min
TOB-02 TOB-02	059 059 059 059 059 059 059 059 059 059	05:02 05:03 05:09 05:12 05:44 05:55 05:58 06:55 06:24 06:15 06:24 06:15 06:24 06:31 06:35 06:38 06:31 06:35 06:38 07:00 07:04 07:04	03 scie Lati deg	38.14 36.89 nnce lo itude (f min 35.54	12 12 35)Lon deg	08.91 09.14 gitude (min 09.27	3.636 3.615 W) Dec.Lat 3.592	12.149 12.152 Dec.Lon 12.155	328 252 CMG 017	2.2 2.2 SMG 2.9	3530 3598 Depth 3566	19 19 Swath/ TOBI Line 19	71: 700 699 688 688 688 668 666 666 666 666 666	9 9 9 7 7 406 7 7 7 406 8 508 7 7 7 7 7 2 293 7 7 3	3186 3088 z(m) 3046	394 359 HDG 359	3.683 3.670 Dec.Lat 3.649	12.181 12.151 Plott Dec.Lor 12.154	6304 6110 ted Posi (m) L-bck 6200	3 41.80 3 40.50 ition Lat Deg. Min 3 39.25	12 12 Lon Deg	8.20 8.25 Min 8.80	Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min Haul at 10m/min winch stopped haul 20m/min Iss>0.038, haul 10m/min winch stopped haul 10 Comments winch stopped veer 10m/min veer 15m/min At WP 17, winch stopped haul 15m/min haul 20m/min haul 20m/min Winch stopped
TOB-02 TOB-02	059 059 059 059 059 059 059 059 059 059	05:02 05:03 05:09 05:12 05:44 05:30 05:55 06:55 06:55 06:12 06:15 06:12 06:31 06:35 06:35 06:35 06:35 06:35 06:35 06:35 07:00 07:13 07:27	03 scie Lati 03 03	38.14 36.89 ince lo itude (1 35.54 34.41	12 12 35)Lon deg 12	08.91 09.14 gitude (min 09.27	3.636 3.615 W) Dec.Lat 3.592 3.574	12.149 12.152 Dec.Lon 12.155 12.154	328 252 CMG 017 005	2.2 2.2 SMG 2.9 1.8	3530 3598 Depth 3566	19 19 Swath/ Ine 19 20	7113 7117700 699 688 688 688 668 666 666 666 666 666	9 9 4 4 394 4 394 4 394 4 394 4 394 7 7 7 7 406 3 5 Alt 1 1 5 5 8 508 7 7 7 2 293 7 3 3 3	3186 3088 z(m) 3046 3138	394 359 HDG 359 0.6	3.683 3.670 Dec.La 3.649 3.630	12.181 12.151 Plott Dec.Lor 12.154	6304 6110 ted Pos (m) ↑ L-bck 6200 6202	3 41.80 3 40.50 ition Lat Deg. Min 3 39.25 3 38.00	12 12 Lon Deg 12 12	8.20 8.25 Min 8.80 8.75	Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min Haul at 10m/min winch stopped haul 20m/min Iss>0.038, haul 10m/min winch stopped haul 10 Comments winch stopped veer 10m/min veer 15m/min At WP 17, winch stopped haul 15m/min haul 20m/min haul 25m/min
TOB-02 TOB-02	059 059 059 059 059 059 059 059 059 059	05:02 05:03 05:12 05:14 05:30 05:46 05:57 05:58 06:00 06:12 9 leg1: 06:24 06:28 06:35 06:24 06:28 06:35 06:40 06:45 06:42 06:35 06:40 06:47 06:45 06:40 06:47 06:45 06:40 06:47 06:46 06:47 07:47 07:00 07:00 07:00 07:00 07:00 07:00 07:00 07:00 07:00 07:00 07:00 06:55 05:55 07:00 07:00 07:27 07:30 07:30 05:555 05:555	03 scie Lati 03 03	38.14 36.89 nnce lo itude (f min 35.54	12 12 35)Lon deg 12	08.91 09.14 gitude (min 09.27	3.636 3.615 W) Dec.Lat 3.592	12.149 12.152 Dec.Lon 12.155	328 252 CMG 017 005	2.2 2.2 SMG 2.9	3530 3598 Depth 3566	19 19 Swath/ TOBI Line 19	7113 7117 7007 699 688 6888 6688 6688 6688 6686 6666 6666 6666 6666 6666 6666 6666 6666	9 9 4 4 394 4 394 4 394 4 394 4 394 4 394 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	3186 3088 z(m) 3046	394 359 HDG 359	3.683 3.670 Dec.Lat 3.649	12.181 12.151 Plott Dec.Lor 12.154	6304 6110 ted Pos (m) ↑ L-bck 6200 6202	3 41.80 3 40.50 ition Lat Deg. Min 3 39.25	12 12 Lon Deg 12 12	8.20 8.25 Min 8.80	Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min Haul at 10m/min winch stopped haul 20m/min Iss>0.038, haul 10m/min winch stopped haul 10 Comments winch stopped veer 10m/min veer 15m/min At WP 17, winch stopped haul 15m/min haul 20m/min haul 25m/min haul 25m/min Winch stopped haul 10
TOB-02 TOB-02	059 059 059 059 059 059 059 059 059 059	05:02 05:03 05:12 05:14 05:30 05:42 05:44 05:30 06:47 05:55 05:58 06:00 06:12 9 leg1: Time 06:24 06:23 06:28 06:31 06:35 06:38 07:00 07:70 07:30 07:732	03 scie Lati 03 03	38.14 36.89 ince lo itude (1 35.54 34.41	12 12 35)Lon deg 12	08.91 09.14 gitude (min 09.27	3.636 3.615 W) Dec.Lat 3.592 3.574	12.149 12.152 Dec.Lon 12.155 12.154	328 252 CMG 017 005	2.2 2.2 SMG 2.9 1.8	3530 3598 Depth 3566	19 19 Swath/ Ine 19 20	7113 7117700 699 68556 68856 68666 66666 66666 66666 66666 66666 66666 6666	9 9 3 0 7 7 4 4 394 4 394 4 394 7 7 7 7 7 7 7 7 7 7 7 7 8 7 7 7 7 8 5 8 5	3186 3088 z(m) 3046 3138	394 359 HDG 359 0.6	3.683 3.670 Dec.La 3.649 3.630	12.181 12.151 Plott Dec.Lor 12.154	6304 6110 ted Pos (m) ↑ L-bck 6200 6202	3 41.80 3 40.50 ition Lat Deg. Min 3 39.25 3 38.00	12 12 Lon Deg 12 12	8.20 8.25 Min 8.80 8.75	Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min Haul at 10m/min winch stopped haul 20m/min Iss>0.038, haul 10m/min winch stopped haul 10 Comments winch stopped veer 10m/min veer 15m/min At WP 17, winch stopped haul 15m/min haul 25m/min Winch stopped haul 10 Minch stopped
TOB-02 TOB-02	059 059 059 059 059 059 059 059 059 059	05:02 05:03 05:12 05:14 05:30 05:46 05:57 05:58 06:00 06:12 9 leg1: 06:24 06:28 06:35 06:24 06:28 06:35 06:40 06:45 06:42 06:35 06:40 06:47 06:45 06:40 06:47 06:45 06:40 06:47 06:46 06:47 07:47 07:00 07:00 07:00 07:00 07:00 07:00 07:00 07:00 07:00 07:00 07:00 06:55 05:55 07:00 07:00 07:27 07:30 07:30 05:55	03 scie Lati 03 03	38.14 36.89 ince lo itude (1 35.54 34.41	12 12 35)Lon deg 12	08.91 09.14 gitude (min 09.27	3.636 3.615 W) Dec.Lat 3.592 3.574	12.149 12.152 Dec.Lon 12.155 12.154	328 252 CMG 017 005	2.2 2.2 SMG 2.9 1.8	3530 3598 Depth 3566	19 19 Swath/ Ine 19 20	7113 7117 7007 699 688 6888 6688 6688 6688 6686 6666 6666 6666 6666 6666 6666 6666 6666	9 9 3 0 7 7 4 4 394 4 394 4 394 7 7 7 7 7 7 7 7 7 7 7 7 8 7 7 7 7 8 5 8 5	3186 3088 z(m) 3046 3138	394 359 HDG 359 0.6	3.683 3.670 Dec.La 3.649 3.630	12.181 12.151 Plott Dec.Lor 12.154	6304 6110 ted Pos (m) ↑ L-bck 6200 6202	3 41.80 3 40.50 ition Lat Deg. Min 3 39.25 3 38.00	12 12 Lon Deg 12 12	8.20 8.25 Min 8.80 8.75	Haul at 20m/min, engine speed back up by 5 rpm haul at 25m/min Haul at 10m/min winch stopped haul 20m/min Iss>0.038, haul 10m/min winch stopped haul 10 Comments winch stopped veer 10m/min veer 15m/min At WP 17, winch stopped haul 15m/min haul 20m/min haul 25m/min haul 25m/min Winch stopped haul 10

TOB-02	059	07:51		12 09.14	3.543	12.152	018	2.2			623									increase ship speed to 2.5
TOB-02	059	08:00	03 32.20	12 09.11	3.537	12.152	359	2.8	3825	20	623	1 387	3081	6	3.587	12.157	5606	3 35.20	12 9.20	
TOB-02	059	08:30	03 31.03	12 09.08	3.517	12.151	017	1.9	3753	20	623	1 454	3071	8.5	3.568	12.159	5612	3 34.00	12 9.50	
TOB-02	059	08:35									623									Veer 10 m/m
TOB-02	059	08:41	03 30.56	12 09.06	3.509	12.151	005	2.5	3773	20	629	3 478	3080	6.8	3.561	12.157	5678	3 33.40	12 9.25	Winch stopped. Engine down: bow thruster only.
TOB-02	059	08:50	03 30.25	12 09.06	3.504	12.151	000	1.4	3802	20	629	3 435	3095	6.3	3.555	12.157	5669			
TOB-02	059	08:51									629									Haul 15 m/m
TOB-02	059	08:59	03 30.00	12 09.06	3.500	12.151	350	1.3	3775	20	619	479	3124	6.3	3.550	12.157	5534	3 33.00	12 9.50	Increase haul 20 m/m
TOB-02	059	09:03									609	5								Increase haul 25 m/m
TOB-02	059	09:10	03 29.73	12 09.07	3.496	12.151	349	1.7	3663	20	590)								
TOB-02	059	09:20	03 29.46	12 09.06	3.491	12.151	004	1.4	3726	20	570)								
TOB-02	059	09:30	03 29.14	12 09.03	3.486	12.151	029	2.1	3835	20	541		2958	5.9	3.528	12.155	4726	3 31.80	12 9.20	
TOB-02	059	09:42	03 28.77	12 09.06	3.480	12.151	010	1.7	3812	20	510	7								
TOB-02	059	09:50	03 28.53	12 08.98	3.476	12.150	002	1.8	3790	20	491	3								
TOB-02	059	09:52									486	3								Increase haul 60m/m - Bow thruster stopped
TOB-02	059	09:53																		Decrease haul 20m/m - bow thruster on again
TOB-02	059	10:00	03 28.30	12 09.03	3.472	12.151	359	2.0	3695	20	465	916	2747	4.9	3.507	12.154	3943	3 30.40	12 9.30	Decrease haul 10 m/m
TOB-02	059	10:01									464									Winch stopped
TOB-02	059	10:10		12 08.99	3.466	12.150	007	2.1	3680	20	464)								
TOB-02	059	10:20	03 27.69	12 09.02	3.462	12.150	005	1.8	3731	20	464									
TOB-02	059	10:30	03 27.38	12 09.03	3.456	12.151	011	2.0	3743	20	464		2765	2.9	3.492	12.152	3917	3 29.50	12 9.00	
TOB-02	059	10:35									464									veer 10m/min
TOB-02	059	10:40	03 26.99	12 08.98	3.450	12.150	358	1.9	3706	20	469									
TOB-02	059	10:50	03 26.68	12 08.94	3.445	12.149	015	1.8	3717	20	477									
TOB-02	059	11:00	03 26.30	12 08.90	3.438	12.148	005	1.8	3725	20	488		2757	360	3.477	12.148	4217	3 26.30	12 9.10	
TOB-02	059	11:10	03 25.97	12 08.88	3.433	12.148	015	2.1	3712	20	497									
TOB-02	059	11:20	03 25.61	12 08.88	3.427	12.148	007	2.1	3691	20	506									Main engine repaired
TOB-02	059	11:24									509									Increase veer to 20m/m - Back on main propulsion
TOB-02	059	11:30	03 25.27	12 08.92	3.421	12.149	348	1.6	3613	20	524		2864	6.7	3.463	12.154	4580	3 28.00	12 9.10	
TOB-02	059	11:38									537									Decrease veer 10m/m
TOB-02	059	12:00	03 24.39	12 08.84	3.407	12.147	000	2.1	3464	20	559			5.8	3.450	12.152	4809	3 27.00	12 9.00	A/C for W/P 18
TOB-02	059	12:30	03 23.41	12 08.95	3.390	12.149	332	2.0	3528	21	579		3272	6.9	3.435	12.155	4975	3 26.00	19 9.00	
TOB-02	059	12:44									579									haul at 10 m/min
TOB-02	059	12:47									574									haul at 35 m/min
TOB-02	059	12:48									571									haul at 20 m/min
TOB-02 TOB-02	059 059	12:51 12:56									566 566									winch stopped haul at 10 m/min
TOB-02 TOB-02	059		02 22 27	12 00 14	2 272	10 150	240	2.0	3300	21			3104	4 5	2 447	10 150	4882	2 24 95	12 8.85	naulat io m/min
TOB-02 TOB-02	059	13:00 13:30	03 22.37 03 21.32	12 09.14 12 09.39	3.373 3.355	12.152 12.157	349 333	2.0 2.5	3502	21 21	562 538			1.5 357	3.417 3.399	12.153 12.154	4002 4771	3 24.85 3 23.80	12 0.05	
TOB-02 TOB-02	059	13:30			3.355	12.157	333	2.5	3502	21	538		2039	357	3.399	12.154	4//1	3 23.00	12 9.00	
TOB-02																				Voor at 20 m/min
																				Veer at 20 m/min Storned winch
	059	13:51			2 226	10 160	251	2.0	2470	21	571	7	2001	256	2 202	10 150	5120	2 22 60	12 8 00	Veer at 20 m/min Stopped winch
TOB-02	059	13:51 14:00	03 20.14	12 09.69	3.336	12.162	351	2.0	3470	21		7	2881	356	3.382	12.158	5129	3 22.60	12 8.90	Stopped winch
TOB-02	059 059	13:51 14:00 14:10			3.336	12.162	351	2.0	3470	21	571 571	7 3 479	2881	356	3.382	12.158	5129	3 22.60	12 8.90	Stopped winch Veer at 20 m/min
TOB-02 TOB-02	059 059 059	13:51 14:00 14:10 14:22			3.336	12.162	351	2.0	3470	21	571 571 594	7 3 479 9	2881	356	3.382	12.158	5129	3 22.60	12 8.90	Stopped winch Veer at 20 m/min winch stopped
TOB-02	059 059 059 059	13:51 14:00 14:10 14:22 14:27	03 20.14	12 09.69	3.336	12.162	351	2.0			571 571	7 3 479 9	2881	356	3.382				12 8.90	Stopped winch Veer at 20 m/min
TOB-02 TOB-02	059 059 059 059 CD16	13:51 14:00 14:10 14:22 14:27	03 20.14 science log	12 09.69		12.162	351	2.0		Swath/	571 571 594 594	7 3 479 9	2881	356	3.382		ed Posi	tion		Stopped winch Veer at 20 m/min winch stopped Veer at 15 m/min
TOB-02 TOB-02 TOB-02	059 059 059 059 CD16 SHIP	13:51 14:00 14:10 14:22 14:27 9 leg1:	03 20.14 science log Latitude (S	12 09.69) Longitude	(w)					Swath/ TOBI	571 571 594 594 594	7 3 479 9				Plott	ed Posi (m)	tion Lat	Lon	Stopped winch Veer at 20 m/min winch stopped
TOB-02 TOB-02	059 059 059 059 CD16 SHIP JD	13:51 14:00 14:10 14:22 14:27 9 leg1: Time	03 20.14 science log Latitude (S deg min	12 09.69)Longitude deg min	(W) Dec.Lat	Dec.Lon	CMG			Swath/ TOBI Line #	571 571 594 594 594 594	7 3 479 9 1 1 1 1 Alt	z(m)	HDG	Dec.Lat	Plott Dec.Lon	ed Posi (m)	tion Lat		Stopped winch Veer at 20 m/min winch stopped Veer at 15 m/min Comments
TOB-02 TOB-02 TOB-02 Operation TOB-02	059 059 059 CD16 SHIP JD 059	13:51 14:00 14:10 14:22 14:27 9 leg1: Time 14:30	03 20.14 science log Latitude (S deg min 03 19.11	12 09.69)Longitude deg min 12 09.97	(W) Dec.Lat 3.319	Dec.Lon	CMG 340	SMG 2.0	Depth 3706	Swath/ TOBI Line # 21	571 571 594 594 594 594 594	7 3 479 9 9 9 1 1 9 1 1 5 286	z(m) 2984	HDG 352	Dec.Lat 3.367	Plott Dec.Lon 12.159	ed Posi (m) L-bck 5390	tion Lat Deg. Min 3 21.90	Lon Deg Min 12 9.20	Stopped winch Veer at 20 m/min winch stopped Veer at 15 m/min Comments Winch stopped , hauling at 30 m/min.
TOB-02 TOB-02 TOB-02 Operation TOB-02 TOB-02	059 059 059 CD16 SHIP JD 059 059	13:51 14:00 14:10 14:22 14:27 9 leg1: 7 time 14:30 15:00	03 20.14 science log Latitude (S deg min 03 19.11 03 17.97	12 09.69)Longitude deg min 12 09.97 12 10.19	(W) Dec.Lat 3.319 3.300	Dec.Lon 12.166 12.170	CMG 340 359	SMG 2.0 2.0	Depth 3706 3540	Swath/ TOBI Line # 21 21	571 571 594 594 594 594 TOE W/c 599 512	7 3 479 9 9 9 1 1 5 286 5 852	z(m) 2984 2524	HDG 352 348	Dec.Lat 3.367 3.341	Plott Dec.Lon 12.159 12.161	ed Posi (m) L-bck 5390 4655	tion Lat Deg. Min 3 21.90 3 20.60	Lon Deg Min 12 9.20 12 10.45	Stopped winch Veer at 20 m/min winch stopped Veer at 15 m/min Comments
TOB-02 TOB-02 TOB-02 Operation TOB-02	059 059 059 CD16 SHIP JD 059	13:51 14:00 14:10 14:22 14:27 9 leg1: 14:30 15:00 15:30	03 20.14 science log Latitude (S deg min 03 19.11 03 17.97 03 16.80	12 09.69)Longitude deg min 12 09.97 12 10.19 12 10.47	(W) Dec.Lat 3.319 3.300 3.280	Dec.Lon	CMG 340	SMG 2.0	Depth 3706	Swath/ TOBI Line # 21 21 21 21	571 571 594 594 594 594 594	7 3 479 9 9 1 5 5 852 4	z(m) 2984	HDG 352 348 348	Dec.Lat 3.367	Plott Dec.Lon 12.159	ed Posi (m) L-bck 5390	tion Lat Deg. Min 3 21.90	Lon Deg Min 12 9.20	Stopped winch Veer at 20 m/min winch stopped Veer at 15 m/min Comments Winch stopped , hauling at 30 m/min.
TOB-02 TOB-02 TOB-02 Operation TOB-02 TOB-02 TOB-02	059 059 059 CD16 SHIP JD 059 059	13:51 14:00 14:10 14:22 14:27 9 leg1: 7 time 14:30 15:00	03 20.14 science log Latitude (S deg min 03 19.11 03 17.97	12 09.69)Longitude deg min 12 09.97 12 10.19	(W) Dec.Lat 3.319 3.300	Dec.Lon 12.166 12.170 12.175	CMG 340 359 352	SMG 2.0 2.0 2.3	Depth 3706 3540 3667	Swath/ TOBI Line # 21 21	571' 571; 594; 594; 594; TOE W/c 599; 512; 421;	7 3 479 3 479 3 4 9 3 4 5 852 4 0	z(m) 2984 2524 2030	HDG 352 348	Dec.Lat 3.367 3.341 3.314	Plott Dec.Lon 12.159 12.161 12.167	ed Posi (m) L-bck 5390 4655 3883	tion Lat Deg. Min 3 21.90 3 20.60	Lon Deg Min 12 9.20 12 10.45	Stopped winch Veer at 20 m/min winch stopped Veer at 15 m/min Comments Winch stopped , hauling at 30 m/min.
TOB-02 TOB-02 TOB-02 Operation TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 CD16 SHIP JD 059 059 059 059	13:51 14:00 14:10 14:22 14:27 9 leg1: 14:30 15:00 15:30 16:00	03 20.14 science log Latitude (S deg min 03 19.11 03 17.97 03 16.80 03 15.61	12 09.69)Longitude deg min 12 09.97 12 10.19 12 10.47 12 10.75	(W) Dec.Lat 3.319 3.300 3.280 3.260	Dec.Lon 12.166 12.170 12.175 12.179	CMG 340 359 352 344	SMG 2.0 2.3 2.1	Depth 3706 3540 3667 3667	Swath/ TOBI Line # 21 21 21 21 21	5711 5713 5944 5944 5944 TOE W/c 5999 5122 4214 328	7 479 9 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 286 9 852 1 1	z(m) 2984 2524 2030 1601	HDG 352 348 348 351	Dec.Lat 3.367 3.341 3.314 3.288	Plott Dec.Lon 12.159 12.161 12.167 12.175	ed Posi (m) L-bck 5390 4655 3883 3053	tion Lat Deg. Min 3 21.90 3 20.60	Lon Deg Min 12 9.20 12 10.45	Stopped winch Veer at 20 m/min winch stopped Veer at 15 m/min Comments Winch stopped , hauling at 30 m/min.
TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 CD16 SHIP JD 059 059 059 059 059	13:51 14:00 14:10 14:22 14:27 9 leg1: Time 14:30 15:00 15:30 16:00 16:30	03 20.14 science log Latitude (S deg min 03 19.11 03 17.97 03 16.80 03 15.61 03 14.50	12 09.69 beneficial 12 09.97 12 10.19 12 10.47 12 10.75 12 10.78	(W) Dec.Lat 3.319 3.300 3.280 3.260 3.242	Dec.Lon 12.166 12.170 12.175 12.179 12.180	CMG 340 359 352 344 025	SMG 2.0 2.3 2.1 2.9	Depth 3706 3540 3667 3667 3557	Swath/ TOBI 21 21 21 21 21 21 21	5711 5713 5944 5944 5944 5994 5122 4214 3286 225	7 479 9 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 286 9 852 1 1	z(m) 2984 2524 2030 1601 1193	HDG 352 348 351 355	Dec.Lat 3.367 3.341 3.314 3.288 3.261	Plott Dec.Lon 12.159 12.161 12.167 12.175 12.178	ed Posi (m) L-bck 5390 4655 3883 3053 2099	tion Lat Deg. Min 3 21.90 3 20.60	Lon Deg Min 12 9.20 12 10.45	Stopped winch Veer at 20 m/min winch stopped Veer at 15 m/min Comments Winch stopped , hauling at 30 m/min.
TOB-02 TOB-02 TOB-02 Operation TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 CD16 SHIP JD 059 059 059 059 059 059	13:51 14:00 14:10 14:22 14:27 9 leg1: Time 14:30 15:00 15:30 16:00 16:30 16:30 17:00 17:25	03 20.14 science log Latitude (S deg min 03 19.11 03 17.97 03 16.80 03 15.61 03 14.50	12 09.69 beneficial 12 09.97 12 10.19 12 10.47 12 10.75 12 10.78	(W) Dec.Lat 3.319 3.300 3.280 3.260 3.242	Dec.Lon 12.166 12.170 12.175 12.179 12.180	CMG 340 359 352 344 025	SMG 2.0 2.3 2.1 2.9	Depth 3706 3540 3667 3667 3557	Swath/ TOBI 21 21 21 21 21 21 21	5711 5713 5944 5944 5944 5994 5122 4214 3286 225	7 479 9 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 286 9 852 1 1	z(m) 2984 2524 2030 1601 1193	HDG 352 348 351 355	Dec.Lat 3.367 3.341 3.314 3.288 3.261	Plott Dec.Lon 12.159 12.161 12.167 12.175 12.178	ed Posi (m) L-bck 5390 4655 3883 3053 2099	tion Lat Deg. Min 3 21.90 3 20.60	Lon Deg Min 12 9.20 12 10.45	Stopped winch Veer at 20 m/min winch stopped Veer at 15 m/min Comments Winch stopped , hauling at 30 m/min. RECOVERING TOBI
TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 CD16 SHIP JD 059 059 059 059 059 059 059	13:51 14:00 14:10 14:22 14:27 9 leg1: Time 14:30 15:00 15:30 16:00 16:30 16:30 17:00	03 20.14 science log Latitude (S deg min 03 19.11 03 17.97 03 16.80 03 15.61 03 14.50	12 09.69 beneficial 12 09.97 12 10.19 12 10.47 12 10.75 12 10.78	(W) Dec.Lat 3.319 3.300 3.280 3.260 3.242	Dec.Lon 12.166 12.170 12.175 12.179 12.180	CMG 340 359 352 344 025	SMG 2.0 2.3 2.1 2.9	Depth 3706 3540 3667 3667 3557	Swath/ TOBI 21 21 21 21 21 21 21	5711 5713 5944 5944 5944 5994 5122 4214 3286 225	7 479 9 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 286 9 852 1 1	z(m) 2984 2524 2030 1601 1193	HDG 352 348 351 355	Dec.Lat 3.367 3.341 3.314 3.288 3.261	Plott Dec.Lon 12.159 12.161 12.167 12.175 12.178	ed Posi (m) L-bck 5390 4655 3883 3053 2099	tion Lat Deg. Min 3 21.90 3 20.60	Lon Deg Min 12 9.20 12 10.45	Stopped winch Veer at 20 m/min winch stopped Veer at 15 m/min Comments Winch stopped , hauling at 30 m/min. RECOVERING TOBI MAPR 9 inboard
TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 CD16 SHIP JD 059 059 059 059 059 059 059 059 059	13:51 14:00 14:10 14:22 14:27 9 leg1: Time 14:30 15:00 15:30 16:00 16:30 16:30 16:30 17:00 17:25 17:31	03 20.14 science log Latitude (S deg min 03 19.11 03 17.97 03 16.80 03 15.61 03 14.50	12 09.69 beneficial 12 09.97 12 10.19 12 10.47 12 10.75 12 10.78	(W) Dec.Lat 3.319 3.300 3.280 3.260 3.242	Dec.Lon 12.166 12.170 12.175 12.179 12.180	CMG 340 359 352 344 025	SMG 2.0 2.3 2.1 2.9	Depth 3706 3540 3667 3667 3557	Swath/ TOBI 21 21 21 21 21 21 21	5711 5713 5944 5944 5944 5994 5122 4214 3286 225	7 479 9 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 286 9 852 1 1	z(m) 2984 2524 2030 1601 1193	HDG 352 348 351 355	Dec.Lat 3.367 3.341 3.314 3.288 3.261	Plott Dec.Lon 12.159 12.161 12.167 12.175 12.178	ed Posi (m) L-bck 5390 4655 3883 3053 2099	tion Lat Deg. Min 3 21.90 3 20.60	Lon Deg Min 12 9.20 12 10.45	Stopped winch Veer at 20 m/min winch stopped Veer at 15 m/min Comments Winch stopped , hauling at 30 m/min. RECOVERING TOBI MAPR 9 inboard MAPR 8 inboard
TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 CD16 SHIP JD 059 059 059 059 059 059 059 059 059 059	13:51 14:00 14:10 14:22 14:27 9 leg1: Time 14:30 15:30 15:30 15:30 16:00 16:30 17:00 17:25 17:31 17:35	03 20.14 science log Latitude (S deg min 03 19.11 03 17.97 03 16.80 03 15.61 03 14.50	12 09.69 beneficial 12 09.97 12 10.19 12 10.47 12 10.75 12 10.78	(W) Dec.Lat 3.319 3.300 3.280 3.260 3.242	Dec.Lon 12.166 12.170 12.175 12.179 12.180	CMG 340 359 352 344 025	SMG 2.0 2.3 2.1 2.9	Depth 3706 3540 3667 3667 3557	Swath/ TOBI 21 21 21 21 21 21 21	5711 5713 5944 5944 5944 5994 5122 4214 3286 225	7 479 9 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 286 9 852 1 1	z(m) 2984 2524 2030 1601 1193	HDG 352 348 351 355	Dec.Lat 3.367 3.341 3.314 3.288 3.261	Plott Dec.Lon 12.159 12.161 12.167 12.175 12.178	ed Posi (m) L-bck 5390 4655 3883 3053 2099	tion Lat Deg. Min 3 21.90 3 20.60	Lon Deg Min 12 9.20 12 10.45	Stopped winch Veer at 20 m/min winch stopped Veer at 15 m/min Comments Winch stopped , hauling at 30 m/min. RECOVERING TOBI MAPR 9 inboard MAPR 8 inboard depressor inboard
TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 059 059 059 059 059 059 059	13:51 14:00 14:10 14:22 14:27 9 leg1: Time 14:30 15:30 15:30 15:30 16:00 15:30 16:00 17:25 17:31 17:35 18:00	03 20.14 science log Latitude (S deg min 03 19.11 03 17.97 03 16.80 03 15.61 03 14.50	12 09.69 beneficial 12 09.97 12 10.19 12 10.47 12 10.75 12 10.78	(W) Dec.Lat 3.319 3.300 3.280 3.260 3.242	Dec.Lon 12.166 12.170 12.175 12.179 12.180	CMG 340 359 352 344 025	SMG 2.0 2.3 2.1 2.9	Depth 3706 3540 3667 3667 3557	Swath/ TOBI Line # 21 21 21 21 21 21	5711 5713 5944 5944 5944 5994 5122 4214 3286 225	7 479 9 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 286 9 852 1 1	z(m) 2984 2524 2030 1601 1193	HDG 352 348 351 355	Dec.Lat 3.367 3.341 3.314 3.288 3.261	Plott Dec.Lon 12.159 12.161 12.167 12.175 12.178	ed Posi (m) L-bck 5390 4655 3883 3053 2099	tion Lat Deg. Min 3 21.90 3 20.60	Lon Deg Min 12 9.20 12 10.45	Stopped winch Veer at 20 m/min winch stopped Veer at 15 m/min Comments Winch stopped , hauling at 30 m/min. RECOVERING TOBI MAPR 9 inboard MAPR 8 inboard depressor inboard TOBI inboard
TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 059 059 059 059 059 059 059	13:51 14:00 14:10 14:22 14:27 9 leg1: Time 14:30 15:00 15:30 16:00 16:30 16:00 16:30 17:25 17:31 17:35 18:00 18:14	03 20.14 science log Latitude (S deg min 03 19.11 03 17.97 03 16.80 03 15.61 03 14.50	12 09.69 beneficial 12 09.97 12 10.19 12 10.47 12 10.75 12 10.78	(W) Dec.Lat 3.319 3.300 3.280 3.260 3.242	Dec.Lon 12.166 12.170 12.175 12.179 12.180	CMG 340 359 352 344 025	SMG 2.0 2.3 2.1 2.9	Depth 3706 3540 3667 3667 3557	Swath/ TOBI Line # 21 21 21 21 21 21	5711 5713 5944 5944 5944 5994 5122 4214 3286 225	7 479 9 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 286 9 852 1 1	z(m) 2984 2524 2030 1601 1193	HDG 352 348 351 355	Dec.Lat 3.367 3.341 3.314 3.288 3.261	Plott Dec.Lon 12.159 12.161 12.167 12.175 12.178	ed Posi (m) L-bck 5390 4655 3883 3053 2099	tion Lat Deg. Min 3 21.90 3 20.60	Lon Deg Min 12 9.20 12 10.45	Stopped winch Veer at 20 m/min winch stopped Veer at 15 m/min Comments Winch stopped , hauling at 30 m/min. RECOVERING TOBI MAPR 9 inboard MAPR 8 inboard depressor inboard TOBI inboard MAPR 29 inboard
TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 059 059 059 059 059 059 059	13:51 14:00 14:10 14:22 14:27 9 leg1: 7 Time 14:30 15:00 15:30 16:00 16:30 16:30 17:25 17:31 17:35 18:00 18:14 18:18	03 20.14 science log Latitude (S deg min 03 19.11 03 17.97 03 16.80 03 15.61 03 14.50	12 09.69 beneficial 12 09.97 12 10.19 12 10.47 12 10.75 12 10.78	(W) Dec.Lat 3.319 3.300 3.280 3.260 3.242	Dec.Lon 12.166 12.170 12.175 12.179 12.180	CMG 340 359 352 344 025	SMG 2.0 2.3 2.1 2.9	Depth 3706 3540 3667 3667 3557	Swath/ TOBI Line # 21 21 21 21 21 21	5711 5713 5944 5944 5944 5994 5122 4214 3286 225	7 479 9 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 286 9 852 1 1	z(m) 2984 2524 2030 1601 1193	HDG 352 348 351 355	Dec.Lat 3.367 3.341 3.314 3.288 3.261	Plott Dec.Lon 12.159 12.161 12.167 12.175 12.178	ed Posi (m) L-bck 5390 4655 3883 3053 2099	tion Lat Deg. Min 3 21.90 3 20.60	Lon Deg Min 12 9.20 12 10.45	Stopped winch Veer at 20 m/min winch stopped Veer at 15 m/min Comments Winch stopped , hauling at 30 m/min. RECOVERING TOBI MAPR 9 inboard MAPR 9 inboard depressor inboard TOBI inboard MAPR 29 inboard MAPR 29 inboard MAPR 6 inboard
TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02 TOB-02	059 059 059 059 059 059 059 059 059 059	13:51 14:00 14:10 14:22 14:27 9 leg1: Time 14:30 15:00 15:00 16:00 16:30 16:30 16:30 17:00 17:25 17:31 17:35 18:00 18:14 18:18 18:22	03 20.14 science log Latitude (S deg min 03 19.11 03 17.97 03 16.80 03 15.61 03 14.50	12 09.69 beneficial 12 09.97 12 10.19 12 10.47 12 10.75 12 10.78	(W) Dec.Lat 3.319 3.300 3.280 3.260 3.242	Dec.Lon 12.166 12.170 12.175 12.179 12.180	CMG 340 359 352 344 025	SMG 2.0 2.3 2.1 2.9	Depth 3706 3540 3667 3667 3557	Swath/ TOBI Line # 21 21 21 21 21 21	5711 5713 5944 5944 5944 5994 5122 4214 3286 225	7 479 9 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 286 9 852 1 1	z(m) 2984 2524 2030 1601 1193	HDG 352 348 351 355	Dec.Lat 3.367 3.341 3.314 3.288 3.261	Plott Dec.Lon 12.159 12.161 12.167 12.175 12.178	ed Posi (m) L-bck 5390 4655 3883 3053 2099	tion Lat Deg. Min 3 21.90 3 20.60	Lon Deg Min 12 9.20 12 10.45	Stopped winch Veer at 20 m/min winch stopped Veer at 15 m/min Comments Winch stopped , hauling at 30 m/min. RECOVERING TOBI MAPR 9 inboard MAPR 8 inboard depressor inboard TOBI inboard MAPR 29 inboard MAPR 13 inboard

o/c for w.p. 20 (start TOBI 3) 059 18:35 03 15.20 12 09.30 3.253 12.155 163 5.0 3012 Transit 12 08.33 059 19:03 03 10.09 3.168 12.139 163 7.9 3263 3.5kHz switched off, end of roll 2. Transit 059 19:30 03 22.60 12 07.30 3.377 12.122 166 8.2 Transit 3045 03 26.40 12 06.40 171 End of log until TOBI 3 deployment JD 60 am. 059 20:00 3.440 12.107 7.7 3314 Transit 11.671 165 7.8 2985 Transit 060 07:30 04 50.00 11 40.28 4.833 060 08:00 04 53.86 11 39.83 4.898 162 Transit 11.664 8.2 3264 060 08:14 On station TOBI 03 **TOB-03** 04 55.21 11 38.62 4.920 11.644 11 38.36 TOB-03 060 08:30 04 55.85 4.931 11.639 Transited to new start position TOB-03 060 08:32 BAT fish and MAPR 12 in water 060 08:36 **TOB-03** MAPR 13 in water **TOB-03** 060 08:40 MAPR 6 in water 060 **TOB-03** 08:45 MAPR 29 in water 060 08:57 TOBI in water **TOB-03** 060 09:20 **TOB-03** Bomb in water **TOB-03** 060 09:23 MAPR 8 in water 060 09:28 MAPR 9 in water **TOB-03 TOB-03** 060 09:30 04 55.83 11 38.54 4.931 11.642 230 0.2 3422 22 122 060 04 56.36 11 38.34 TOB-03 10:00 4.939 11.639 145 1.5 3424 22 1333 TOB-03 060 10:30 04 57.18 11 37.99 4.953 11.633 141 2.7 4464 22 2532 **TOB-03** 060 11:00 04 58.02 11 37.65 4.967 11.628 155 1.5 4713 22 3714 060 11:24 11.624 190 4397 **TOB-03** 04 58.65 11 37.41 4.978 1.8 22 4715 Start turn TOB-03 060 11:33 04 58.88 11 37.25 4.981 11.621 148 1.8 4335 22 5064 Turn finished. On line 22 **TOB-03** 060 12:00 04 59.48 11 36.73 4.991 11.612 133 2.6 4458 22 6091 370 4134 163 4.951 11.625 4663 4 58.90 11 38.60 Winch stopped TOB-03 060 12:04 6091 laul at 20 m/min 060 12:10 TOB-03 5990 Stopped winch **TOB-03** 060 12:15 5990 eer 10m/min 5.003 11.600 128 1.5 4656 **TOB-03** 060 12:30 05 00.20 11 35.99 22 6176 634 3964 155 4.963 11.619 **4926** 4 58.40 11 38.00 **TOB-03** 060 TOB-03 060 TOB-03 060 TOB-03 060 TOB-03 060 TOB-03 060 060 TOB-03 TOB-03 060 TOB-03 060 TOB-03 060 TOB-03 060 13:00 05 01.08 11 35.45 5.018 11.591 169 2.3 4716 23 6302 558 3791 143 4.980 11.619 5224 4 59.09 11 37.80 ON LINE 23, TOBI offset 750m to west by current. 6302 **TOB-03** 060 13:26 veer 20 m/min 6402 749 3647 151 4.992 11.611 **5452** TOB-03 060 13:30 05 02.13 11 35.25 5.036 11.588 166 2.5 4070 23 4 59.70 11 36.50 CD169 leg1: science log Swath/ **Plotted Position** Latitude (S)Longitude (W) SHIP TOBI TOBI (m) Lat Lon Comments Dec.Lat Dec.Lon CMG SMG Depth Line Alt z(m) HDG Dec.LatDec.Lon L-bck Jeg. Min Operation JD Time deg min deg min W/o Deg Min TOB-03 060 13:44 6663 Stopped winch 060 14:00 4072 6663 3706 157 5.005 5727 5 0.70 11 35.60 TOB-03 05 03.17 11 35.08 5.053 11.585 180 2.2 23 775 11.605 **TOB-03** 060 14:30 05 04.32 11 34.86 5.072 11.581 171 2.5 4150 6664 591 3547 167 5.020 11.593 5832 5 1.25 11 35.30 23 060 TOB-03 14:38 6664 eer at 15 m/min 171 5.035 **TOB-03** 060 15:00 05 05.41 11 34.70 173 2.8 4162 6997 518 3701 11.587 6128 5 2.20 11 35.50 5.090 11.578 23 Stopped winch Veer at 10 m/m TOB-03 060 15:17 6997 060 15.26 **TOB-03** 7093 Stopped winch 060 5 3.20 TOB-03 15:30 05 06.60 11 34.47 5.110 11.575 163 2.6 4026 23 7093 470 3561 175 5.053 11.580 6324 11 35.20 TOB-03 060 15:50 7093 /eer at 15 m/min 3618 177 5.069 060 176 1.7 3970 546 5 3.95 11 34.95 **TOB-03** 16:00 05 07.68 11 34.29 5.128 11.572 23 7260 11.575 6484 TOB-03 060 16:15 7471 winch stopped **TOB-03** 060 16:25 7471 Haul at 10m/min 05 5.000 060 16:30 11 34.10 160 1.2 7419 11 34.70 **TOB-03** 05 08.73 5.146 11.568 3762 23 331 3753 174 5.086 11.575 6590 5 4.75 **TOB-03** 060 16:32 7399 haul at 15m/min **TOB-03** 060 16:39 7298 winch stopped 060 11 33.94 5.157 11.566 154 2.5 **TOB-03** 16:50 05 09.44 24 o/c at WP 22 **TOB-03** 060 17:00 05 09.80 11 33.80 5.163 11.563 160 2.0 3736 24 7298 334 3698 175 5.105 11.568 **6482** 5 5.95 11 34.30 Haul at 10m/min

TOB-03	060	17:02				Í								7269											haul at 20m/min
TOB-03	060	17:22				Í								6873											winch stopped
TOB-03	060	17:30	05	10.75	11	33.52	5.179	11.559	156	3.1	3758	24		6873	390	3527	171	5.124	11.567	6089	5	7.40	11	34.25	
TOB-03	060	17:40								.				6873				••••			-				Haul 20 m/min nephels 0.047
TOB-03	060	17:44				Í								6809											haul 25m/min nephes 0.045
						Í																			-
TOB-03	060	17:46				Í								6700											haul 30 m/min nephels 0.044
TOB-03	060	17:50				Í								6560											Haul 15 m/min
TOB-03	060	17:58	05			Í	5.000							6510											Haul 25 m/min
TOB-03	060	18:00	05	11.62	11	33.25	5.194	11.554	162	1.8	3752	24		6468	246	3475	170	5.143	11.563	5645	5	8.50	11	34.25	
TOB-03	060	18:07				00.20	0.101				0.02			6286	2.0	0.110		0.1.10			Ũ	0.00	•••	•	Haul 10m/min
						Í																			
TOB-03	060	18:10				Í								6274											Winch stopped
TOB-03	060	18:12				Í																			haul
TOB-03	060	18:13				Í																			haul 25m/min
TOB-03	060	18:17				Í																			haul 15m/min
TOB-03	060	18:23				Í								6056											Winch stopped
TOB-03	060	18:26				Í								6058											veer 10m/min
							5 9 4 9					~ ~				0040		= 101			-				veer rom/mm
TOB-03	060	18:30	05	12.69	11	32.84	5.212	11.547	171	1.6	3660	24		6114	461	3240	169	5.164	11.557	5375	5	9.60	11	33.90	
TOB-03	060	18:46				Í								6254											Stopped winch
TOB-03	060	19:00	05	13.70	11	32.54	5.228	11.542	157	2.8	3608	24		6254	436	3244	168	5.179	11.553	5537	5	11.00	11	33.50	veer 10m/min
TOB-03	060	19:05				Í								6316											veer 15m/min
TOB-03	060	19:17				Í								6483											winch stopped
TOB-03	060	19:30	05	14.84	11	36.16	5.247	11.603	161	2.2	3496	24		6483	379	3231	170	5.195	11.612	5810	5	11.95	11	33.30	innen stoppen
			05	14.04	11	50.10	5.247	11.003	161	۷.۷	3490	24	1 1		319	3231	170	0.195	11.012	3010	5	11.95		33.30	
TOB-03	060	19:42				Í								6483											veer 10m/min
TOB-03	060	20:00	05	15.99	11	31.78	5.267	11.530	154	2.7	3409	24		6661	417	3172	173	5.212	11.536	6047	5	12.90	11	32.95	
TOB-03	060	20:06	05	16.24	11	31.67	5.271	11.528						6720											winch stopped
TOB-03	060	20:30	05	17.14	11	31.41	5.286	11.524	175	2.1	3423	24		6720	322	3124	170	5.231	11.533	6140	5	13.95	11	32.50	Haul 10 m/min
TOB-03	060	20:48									• .= •			6558		• • • •					-				Increase haul to 15 m/m
TOB-03	060	20:51	05	17.91		31.18	5.299	11.520	404	~ 4	3289	0.4			004	0050	454	5.251	44 540	5916					increase had to 15 m/m
				-					164	2.4		24		6489	334	3053	151		11.546		_				
TOB-03	060	21:00		18.21		31.11	5.304	11.519	165	2.6	3350	24		6392	408	3005	170	5.251	11.528	5832		15.30		32.10	winch stopped
TOB-03	060	21:30	05	19.45	11	31.03	5.324	11.517	172	1.8	3325	25		6391	392	3085	172	5.272	11.524	5787	5	16.50	11	31.50	
TOB-03	060	21:32				Í								6391											haul 10m/m
TOB-03	060	21:40				Í								6313											Winch stopped
TOB-03	060	22:00	05	20.62	11	31.07	5.344	11.518	173	2.5	3399	25		6313	381	3024	176	5.292	11.521	5732	5	17.50	11	30.40	
			0.5	20.02		51.07	3.344	11.510	175	2.5	5555	25			301	3024	170	5.2.52	11.521	5152	5	17.50		30.40	have down from
TOB-03	060	22:03				Í								6313											haul 10m/m
TOB-03	060	22:08				Í								6270											winch stopped
TOB-03	060	22:30	05	21.86	11	31.09	5.364	11.518	183	1.5	3395	25		6270	348	2916	182	5.312	11.516	5741	5	18.80	11	31.20	
TOB-03	060	22:36				Í								6270											haul at 10 m/min
TOB-03	060	22:45				Í								6185											Winch stopped
TOB-03	060	23:00	05	23.80	11	31.13	5.397	11.519	190	3.1	3491	25		6185	442	2891	188	5.346	11.512	5658	5	20.20	11	31.20	innen eteppen
				24.17		31.20																			
TOB-03	060	23:30					5.403	11.520	169	2.2	3631	25		6185	457	2923	189	5.352	11.512	5641		21.10		31.10	
TOB-03	061	00:00		25.34	11	31.28	5.422	11.521	182	2.6	3684	25		6185								22.30		31.20	
	CD16	9 leg1:	scier	nce loa											442	2955	190	5.372		5623					
	SHIP											Swath/			442	2955	190	5.372		5623 ed Posi					
Operation	JD		Latit	-	Lon	gitude ((W)							тові	442	2955	190	5.372			tion		Lon		Comments
•		Time		ude (S)		• •		Dec.Lon	СМG	SMG	Depth	Swath/ TOBI		тові					Plott	ed Posi (m)	tion Lat		Lon	Min	Comments
108-03		Time 00:09		ude (S)		gitude (min		Dec.Lon	CMG	SMG	Depth	Swath/ TOBI	 #	TOBI W/o						ed Posi (m)	tion Lat		Lon	Min	Comments
TOB-03	061	00:09		ude (S)		• •		Dec.Lon	CMG	SMG	Depth	Swath/ TOBI		TOBI W/o 6185					Plott	ed Posi (m)	tion Lat		Lon	Min	Comments
TOB-03	061 061	00:09 00:17	deg	tude (S) min	deg	min	Dec.Lat					Swath/ TOBI Line		TOBI W/o 6185 6267	Alt	z(m)	HDG	Dec.Lat	Plott Dec.Lon	ed Posi (m) L-bck	tion Lat Deg.	Min	Lon Deg		Comments
TOB-03 TOB-03	061 061 061	00:09 00:17 00:29	deg	ude (S)	deg	• •		Dec.Lon 11.522	CMG	SMG 2.4	Depth 3823	Swath/ TOBI		TOBI W/o 6185 6267 6266					Plott	ed Posi (m)	tion Lat Deg.		Lon Deg	Min 31.00	
TOB-03	061 061	00:09 00:17	deg	tude (S) min	deg	min	Dec.Lat					Swath/ TOBI Line		TOBI W/o 6185 6267	Alt	z(m)	HDG	Dec.Lat	Plott Dec.Lon	ed Posi (m) L-bck	tion Lat Deg.	Min	Lon Deg		Comments veer at 10 m/min
TOB-03 TOB-03	061 061 061	00:09 00:17 00:29	deg 05	tude (S) min	deg 11	min	Dec.Lat					Swath/ TOBI Line		TOBI W/o 6185 6267 6266	Alt	z(m)	HDG	Dec.Lat	Plott Dec.Lon	ed Posi (m) L-bck	tion Lat Deg. 5	Min	Lon Deg 11		
TOB-03 TOB-03 TOB-03 TOB-03	061 061 061 061 061	00:09 00:17 00:29 00:38 01:00	deg 05	tu de (S) min 26.51	deg 11	min 31.32	Dec.Lat	11.522	171	2.4	3823	Swath/ TOBI Line 25		TOBI W/o 6185 6267 6266 6266 6510	Alt 479	z(m) 3015	HDG 186	Dec.Lat 5.390	Plott Dec.Lon 11.517	ed Posi (m) L-bck 5683	tion Lat Deg. 5	Min 23.25	Lon Deg 11	31.00	veer at 10 m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	061 061 061 061 061 061	00:09 00:17 00:29 00:38 01:00 01:01	deg 05	tu de (S) min 26.51	deg 11	min 31.32	Dec.Lat	11.522	171	2.4	3823	Swath/ TOBI Line 25		TOBI W/o 6185 6267 6266 6266 6510 6515	Alt 479	z(m) 3015	HDG 186	Dec.Lat 5.390	Plott Dec.Lon 11.517	ed Posi (m) L-bck 5683	tion Lat Deg. 5	Min 23.25	Lon Deg 11	31.00	veer at 10 m/min veer at 15 m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	061 061 061 061 061 061 061	00:09 00:17 00:29 00:38 01:00 01:01 01:17	deg 05	tude (S) min 26.51 27.77	deg 11 11	min 31.32 31.36	Dec.Lat 5.442 5.463	11.522 11.523	171 184	2.4 2.2	3823 3730	Swath/ TOBI Line 25 25		TOBI W/o 6185 6267 6266 6266 6510 6515 6752	Alt 479 533	z(m) 3015 3083	HDG 186 190	Dec.Lat 5.390 5.410	Plott Dec.Lon 11.517 11.513	ed Posi (m) L-bck 5683 5924	tion Lat Deg. 5	Min 23.25 24.56	Lon Deg 11 11	31.00 31.30	veer at 10 m/min veer at 15 m/min Stopped winch
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	061 061 061 061 061 061 061	00:09 00:17 00:29 00:38 01:00 01:01 01:17 01:34	deg 05	tu de (S) min 26.51	deg 11 11	min 31.32	Dec.Lat	11.522	171	2.4	3823	Swath/ TOBI Line 25		TOBI W/o 6185 6267 6266 6266 6510 6515 6752 6752	Alt 479	z(m) 3015	HDG 186	Dec.Lat 5.390	Plott Dec.Lon 11.517	ed Posi (m) L-bck 5683	tion Lat Deg. 5	Min 23.25	Lon Deg 11 11	31.00	veer at 10 m/min veer at 15 m/min Stopped winch veer at 15 m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	061 061 061 061 061 061 061 061	00:09 00:17 00:29 00:38 01:00 01:01 01:17 01:34 01:47	deg 05 05	26.51 27.77 29.15	deg 11 11 11	min 31.32 31.36 31.47	Dec.Lat 5.442 5.463 5.486	11.522 11.523 11.525	171 184 154	2.4 2.2 1.7	3823 3730 3707	Swath/ TOBI Line 25 25 25		TOBI W/o 6185 6267 6266 6266 6510 6515 6752 6752 6941	Alt 479 533 571	z(m) 3015 3083 3168	HDG 186 190 186	Dec.Lat 5.390 5.410 5.430	Plott Dec.Lon 11.517 11.513 11.519	ed Posi (m) L-bck 5683 5924 6153	tion Lat Deg. 5 5	Min 23.25 24.56 25.90	Lon Deg 11 11	31.00 31.30 31.10	veer at 10 m/min veer at 15 m/min Stopped winch
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	061 061 061 061 061 061 061 061	00:09 00:17 00:29 00:38 01:00 01:01 01:17 01:34 01:47 02:00	deg 05 05 05	tude (S) min 26.51 27.77 29.15 30.16	deg 11 11 11 11	min 31.32 31.36 31.47 31.49	Dec.Lat 5.442 5.463	11.522 11.523	171 184	2.4 2.2	3823 3730	Swath/ TOBI Line 25 25		TOBI W/o 6185 6267 6266 6266 6510 6515 6752 6752	Alt 479 533 571 516	z(m) 3015 3083 3168 3261	HDG 186 190 186 188	Dec.Lat 5.390 5.410	Plott Dec.Lon 11.517 11.513	ed Posi (m) L-bck 5683 5924	tion Lat Deg. 5 5 5	Min 23.25 24.56 25.90 26.65	Lon Deg 11 11 11	31.00 31.30 31.10 31.20	veer at 10 m/min veer at 15 m/min Stopped winch veer at 15 m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	061 061 061 061 061 061 061 061	00:09 00:17 00:29 00:38 01:00 01:01 01:17 01:34 01:47	deg 05 05 05	26.51 27.77 29.15	deg 11 11 11 11	min 31.32 31.36 31.47	Dec.Lat 5.442 5.463 5.486	11.522 11.523 11.525	171 184 154	2.4 2.2 1.7	3823 3730 3707	Swath/ TOBI Line 25 25 25		TOBI W/o 6185 6267 6266 6266 6510 6515 6752 6752 6941	Alt 479 533 571	z(m) 3015 3083 3168	HDG 186 190 186	Dec.Lat 5.390 5.410 5.430	Plott Dec.Lon 11.517 11.513 11.519	ed Posi (m) L-bck 5683 5924 6153	tion Lat Deg. 5 5 5	Min 23.25 24.56 25.90	Lon Deg 11 11 11	31.00 31.30 31.10	veer at 10 m/min veer at 15 m/min Stopped winch veer at 15 m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	061 061 061 061 061 061 061 061 061	00:09 00:17 00:29 00:38 01:00 01:01 01:17 01:34 01:47 02:00 02:30	deg 05 05 05	tude (S) min 26.51 27.77 29.15 30.16	deg 11 11 11 11	min 31.32 31.36 31.47 31.49	Dec.Lat 5.442 5.463 5.486 5.503	11.52211.52311.52511.525	171 184 154 193	2.4 2.2 1.7 2.5	3823 3730 3707 3570	Swath/ TOBI Line 25 25 25 25 25		TOBI W/o 6185 6267 6266 6510 6515 6752 6752 6941 6941 6941	Alt 479 533 571 516	z(m) 3015 3083 3168 3261	HDG 186 190 186 188	Dec.Lat 5.390 5.410 5.430 5.446	Plott Dec.Lon 11.517 11.513 11.519 11.517	ed Posi (m) L-bck 5683 5924 6153 6317	tion Lat Deg. 5 5 5	Min 23.25 24.56 25.90 26.65	Lon Deg 11 11 11	31.00 31.30 31.10 31.20	veer at 10 m/min veer at 15 m/min Stopped winch veer at 15 m/min stoppen die vinchen
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	061 061 061 061 061 061 061 061 061 061	00:09 00:17 00:29 00:38 01:00 01:01 01:17 01:34 01:47 02:00 02:30 02:31	deg 05 05 05	tude (S) min 26.51 27.77 29.15 30.16	deg 11 11 11 11	min 31.32 31.36 31.47 31.49	Dec.Lat 5.442 5.463 5.486 5.503	11.52211.52311.52511.525	171 184 154 193	2.4 2.2 1.7 2.5	3823 3730 3707 3570	Swath/ TOBI Line 25 25 25 25 25		TOBI W/o 6185 6267 6266 6510 6515 6752 6752 6941 6941 6941 6941	Alt 479 533 571 516	z(m) 3015 3083 3168 3261	HDG 186 190 186 188	Dec.Lat 5.390 5.410 5.430 5.446	Plott Dec.Lon 11.517 11.513 11.519 11.517	ed Posi (m) L-bck 5683 5924 6153 6317	tion Lat Deg. 5 5 5	Min 23.25 24.56 25.90 26.65	Lon Deg 11 11 11	31.00 31.30 31.10 31.20	veer at 10 m/min veer at 15 m/min Stopped winch veer at 15 m/min stoppen die vinchen Veer at 10 m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	061 061 061 061 061 061 061 061 061 061	00:09 00:17 00:29 00:38 01:00 01:01 01:17 01:34 01:47 02:00 02:30 02:31 02:42	deg 05 05 05	tude (S) min 26.51 27.77 29.15 30.16	deg 11 11 11 11	min 31.32 31.36 31.47 31.49	Dec.Lat 5.442 5.463 5.486 5.503	11.52211.52311.52511.525	171 184 154 193	2.4 2.2 1.7 2.5	3823 3730 3707 3570	Swath/ TOBI Line 25 25 25 25 25		TOBI W/o 6185 6267 6266 6510 6515 6752 6752 6941 6941 6941 7055	Alt 479 533 571 516	z(m) 3015 3083 3168 3261	HDG 186 190 186 188	Dec.Lat 5.390 5.410 5.430 5.446	Plott Dec.Lon 11.517 11.513 11.519 11.517	ed Posi (m) L-bck 5683 5924 6153 6317	tion Lat Deg. 5 5 5	Min 23.25 24.56 25.90 26.65	Lon Deg 11 11 11	31.00 31.30 31.10 31.20	veer at 10 m/min veer at 15 m/min Stopped winch veer at 15 m/min stoppen die vinchen Veer at 10 m/min Stopped winch
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	061 061 061 061 061 061 061 061 061 061	00:09 00:17 00:29 00:38 01:00 01:01 01:17 01:34 01:47 02:00 02:30 02:31 02:42 02:49	deg 05 05 05 05	tude (S) min 26.51 27.77 29.15 30.16 31.35	11 11 11 11 11	min 31.32 31.36 31.47 31.49 31.53	Dec.Lat 5.442 5.463 5.486 5.503 5.523	11.522 11.523 11.525 11.525 11.526	171 184 154 193 181	2.42.21.72.52.0	3823 3730 3707 3570 3710	Swath/ TOBI Line 25 25 25 25 25 25		TOBI W/o 6185 6267 6266 6510 6515 6752 6752 6941 6941 6941 7055 7055	Alt 479 533 571 516 555	z(m) 3015 3083 3168 3261 3257	HDG 186 190 186 188 107	Dec.Lat 5.390 5.410 5.430 5.446 5.506	Plott Dec.Lon 11.517 11.513 11.519 11.517 11.581	ed Posi (m) L-bck 5683 5924 6153 6317 6319	tion Lat Deg. 5 5 5 5 5	Min 23.25 24.56 25.90 26.65 28.00	Lon Deg 11 11 11 11	31.00 31.30 31.10 31.20 31.50	veer at 10 m/min veer at 15 m/min Stopped winch veer at 15 m/min stoppen die vinchen Veer at 10 m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	061 061 061 061 061 061 061 061 061 061	00:09 00:17 00:29 00:38 01:00 01:01 01:17 01:34 01:47 02:00 02:30 02:31 02:42 02:49 03:00	deg 05 05 05 05	tude (S) min 26.51 27.77 29.15 30.16	11 11 11 11 11	min 31.32 31.36 31.47 31.49	Dec.Lat 5.442 5.463 5.486 5.503	11.52211.52311.52511.525	171 184 154 193	2.4 2.2 1.7 2.5	3823 3730 3707 3570	Swath/ TOBI Line 25 25 25 25 25		TOBI W/o 6185 6267 6266 6510 6515 6752 6752 6941 6941 6941 7055 7055 6977	Alt 479 533 571 516	z(m) 3015 3083 3168 3261	HDG 186 190 186 188	Dec.Lat 5.390 5.410 5.430 5.446	Plott Dec.Lon 11.517 11.513 11.519 11.517	ed Posi (m) L-bck 5683 5924 6153 6317	tion Lat Deg. 5 5 5 5 5	Min 23.25 24.56 25.90 26.65	Lon Deg 11 11 11 11	31.00 31.30 31.10 31.20	veer at 10 m/min veer at 15 m/min Stopped winch veer at 15 m/min stoppen die vinchen Veer at 10 m/min Stopped winch haul at 10 m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	061 061 061 061 061 061 061 061 061 061	00:09 00:17 00:29 00:38 01:00 01:01 01:17 01:34 01:47 02:00 02:30 02:31 02:42 02:49	deg 05 05 05 05	tude (S) min 26.51 27.77 29.15 30.16 31.35	11 11 11 11 11	min 31.32 31.36 31.47 31.49 31.53	Dec.Lat 5.442 5.463 5.486 5.503 5.523	11.522 11.523 11.525 11.525 11.526	171 184 154 193 181	2.42.21.72.52.0	3823 3730 3707 3570 3710	Swath/ TOBI Line 25 25 25 25 25 25		TOBI W/o 6185 6267 6266 6510 6515 6752 6752 6941 6941 6941 7055 7055	Alt 479 533 571 516 555	z(m) 3015 3083 3168 3261 3257	HDG 186 190 186 188 107	Dec.Lat 5.390 5.410 5.430 5.446 5.506	Plott Dec.Lon 11.517 11.513 11.519 11.517 11.581	ed Posi (m) L-bck 5683 5924 6153 6317 6319	tion Lat Deg. 5 5 5 5 5	Min 23.25 24.56 25.90 26.65 28.00	Lon Deg 11 11 11 11	31.00 31.30 31.10 31.20 31.50	veer at 10 m/min veer at 15 m/min Stopped winch veer at 15 m/min stoppen die vinchen Veer at 10 m/min Stopped winch
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	061 061 061 061 061 061 061 061 061 061	00:09 00:17 00:29 00:38 01:00 01:01 01:17 01:34 01:47 02:00 02:30 02:31 02:42 02:49 03:00	deg 05 05 05 05	tude (S) min 26.51 27.77 29.15 30.16 31.35	11 11 11 11 11	min 31.32 31.36 31.47 31.49 31.53	Dec.Lat 5.442 5.463 5.486 5.503 5.523	11.522 11.523 11.525 11.525 11.526	171 184 154 193 181	2.42.21.72.52.0	3823 3730 3707 3570 3710	Swath/ TOBI Line 25 25 25 25 25 25		TOBI W/o 6185 6267 6266 6510 6515 6752 6752 6941 6941 6941 7055 7055 6977	Alt 479 533 571 516 555	z(m) 3015 3083 3168 3261 3257	HDG 186 190 186 188 107	Dec.Lat 5.390 5.410 5.430 5.446 5.506	Plott Dec.Lon 11.517 11.513 11.519 11.517 11.581	ed Posi (m) L-bck 5683 5924 6153 6317 6319	tion Lat Deg. 5 5 5 5 5	Min 23.25 24.56 25.90 26.65 28.00	Lon Deg 11 11 11 11	31.00 31.30 31.10 31.20 31.50	veer at 10 m/min veer at 15 m/min Stopped winch veer at 15 m/min stoppen die vinchen Veer at 10 m/min Stopped winch haul at 10 m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	061 061 061 061 061 061 061 061 061 061	00:09 00:17 00:29 00:38 01:00 01:01 01:17 01:34 01:47 02:00 02:30 02:31 02:42 02:49 03:00 03:06 03:25	deg 05 05 05 05	tude (S) min 26.51 27.77 29.15 30.16 31.35 32.44	deg 11 11 11 11 11	min 31.32 31.36 31.47 31.49 31.53 31.61	Dec.Lat 5.442 5.463 5.486 5.503 5.523 5.523	11.522 11.523 11.525 11.525 11.526 11.527 #######	171 184 154 193 181 180	 2.4 2.2 1.7 2.5 2.0 2.3 	3823 3730 3707 3570 3710 3600	Swath/ TOBI 25 25 25 25 25 25 25 25		TOBI W/o 6185 6266 6510 6515 6752 6752 6941 6941 6941 7055 7055 6977 6977 6977	Alt 479 533 571 516 555 358	z(m) 3015 3083 3168 3261 3257 3310	HDG 186 190 186 188 107 187	Dec.Lat 5.390 5.410 5.430 5.446 5.506 5.484 #######	Plott Dec.Lon 11.517 11.513 11.519 11.517 11.581 11.581 11.519	ed Posi (m) L-bck 5683 5924 6153 6317 6319 6332	tion Lat)eg. 5 5 5 5 5 5	Min 23.25 24.56 25.90 26.65 28.00 29.00	Lon Deg 11 11 11 11 11	31.00 31.30 31.10 31.20 31.50 31.36	veer at 10 m/min veer at 15 m/min Stopped winch veer at 15 m/min stoppen die vinchen Veer at 10 m/min Stopped winch haul at 10 m/min turned at WP24
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	061 061 061 061 061 061 061 061 061 061	00:09 00:17 00:29 00:38 01:00 01:01 01:17 01:34 01:47 02:00 02:30 02:31 02:42 02:49 03:00 03:06 03:25 03:30	deg 05 05 05 05	tude (S) min 26.51 27.77 29.15 30.16 31.35	deg 11 11 11 11 11	min 31.32 31.36 31.47 31.49 31.53	Dec.Lat 5.442 5.463 5.486 5.503 5.523 5.541	11.522 11.523 11.525 11.525 11.526 11.527	171 184 154 193 181	2.42.21.72.52.0	3823 3730 3707 3570 3710	Swath/ TOBI Line 25 25 25 25 25 25		TOBI Wo 6185 6267 6266 6510 6515 6752 6941 6941 6941 7055 6977 6977 6977 6877	Alt 479 533 571 516 555	z(m) 3015 3083 3168 3261 3257	HDG 186 190 186 188 107	Dec.Lat 5.390 5.410 5.430 5.446 5.506 5.484	Plott Dec.Lon 11.517 11.513 11.519 11.517 11.581 11.581	ed Posi (m) L-bck 5683 5924 6153 6317 6319	tion Lat)eg. 5 5 5 5 5 5	Min 23.25 24.56 25.90 26.65 28.00	Lon Deg 11 11 11 11 11	31.00 31.30 31.10 31.20 31.50	veer at 10 m/min Veer at 15 m/min Stopped winch veer at 15 m/min stoppen die vinchen Veer at 10 m/min Stopped winch haul at 10 m/min turned at WP24 haul @ 15 m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	061 061 061 061 061 061 061 061 061 061	00:09 00:17 00:29 00:38 01:00 01:01 01:17 01:34 01:47 02:00 02:30 02:31 02:42 02:49 03:00 03:06 03:25	deg 05 05 05 05	tude (S) min 26.51 27.77 29.15 30.16 31.35 32.44	deg 11 11 11 11 11	min 31.32 31.36 31.47 31.49 31.53 31.61	Dec.Lat 5.442 5.463 5.486 5.503 5.523 5.523	11.522 11.523 11.525 11.525 11.526 11.527 #######	171 184 154 193 181 180	 2.4 2.2 1.7 2.5 2.0 2.3 	3823 3730 3707 3570 3710 3600	Swath/ TOBI 25 25 25 25 25 25 25 25		TOBI W/o 6185 6266 6510 6515 6752 6752 6941 6941 6941 7055 7055 6977 6977 6977	Alt 479 533 571 516 555 358	z(m) 3015 3083 3168 3261 3257 3310	HDG 186 190 186 188 107 187	Dec.Lat 5.390 5.410 5.430 5.446 5.506 5.484 #######	Plott Dec.Lon 11.517 11.513 11.519 11.517 11.581 11.581 11.519	ed Posi (m) L-bck 5683 5924 6153 6317 6319 6332	tion Lat)eg. 5 5 5 5 5 5	Min 23.25 24.56 25.90 26.65 28.00 29.00	Lon Deg 11 11 11 11 11	31.00 31.30 31.10 31.20 31.50 31.36	veer at 10 m/min veer at 15 m/min Stopped winch veer at 15 m/min stoppen die vinchen Veer at 10 m/min Stopped winch haul at 10 m/min turned at WP24

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TOB-03	061	03:50										6793											haul at 10 m/min
TOB-03	061	03:57										6726											stopped winch
TOB-03	061	04:00	05 3	4.93	11 31.42	5.582	11.524	181	2.5	3762	26	6727	513	3153	186	5.527	11.518	6132	5	32.00	11	31.60	
TOB-03	061	04:06										6726											veer 10m/min
TOB-03	061	04:30	05 3		11 31.32	5.603	11.522	186	2.5	3587	26	6997	457	3245	183	5.545	11.519	6389		32.75		31.75	
TOB-03	061	05:00	05 3		11 31.25	5.625	11.521	173	3.3	3734	26	7311	379	3298	183	5.564	11.518	6715		33.95		31.45	winch stopped
TOB-03	061	05:30	05 3	8.74	11 31.15	5.646	11.519	188	2.7	3730	26	7311	417	3247	182	5.584	11.517	6740	5	35.25	11	31.40	
TOB-03	061	05:36										7311											haul 15m/min
TOB-03	061	05:40										7227											Haul 20 m/min
TOB-03	061	05:47										7121											winch stopped
TOB-03	061	06:00	05 3	9.08	11 31.08	5.651	11.518	180	2.3	3892	26	7121	501	3142	181	5.592	11.517	6580	5	36.60	11	31.30	
TOB-03	061	06:03										7121											veer 10m/min
TOB-03	061	06:13										7221											winch stopped
TOB-03	061	06:18																					problems port side of tobi swath bathymetry
TOB-03	061	06:27																					tried to reboot tobi swath, no effect
TOB-03	061	06:30	05 4	1.28	11 30.98	5.688	11.516	170	1.9	3895	26	7221	440	3213	182	5.628	11.514	6657	5	37.75	11	31.20	
TOB-03	061	06:35																					tried to reboot tobi swath, no effect
TOB-03	061	06:39										7221											veer 10
TOB-03	061	06:48										7310											winch stopped
TOB-03	061	06:56										7310											veer 10m/min
TOB-03	061	07:00	05 4	2.57	11 30.90	5.710	11.515	171	2.2	3863	26	7345	441	3209	182	5.648	11.513	6797	5	39.00	11	31.10	
TOB-03	061	07:03																					reboot attempt tobi swath, no result
TOB-03	061	07:12																					tobi swath back on its own
TOB-03	061	07:22										7567											winch stopped
TOB-03	061	07:23																					ship slowed to <2.5 to lower tobi
TOB-03	061	07:30	05 4	3.80	11 30.80	5.730	11.513	184	1.3	3687	26	7567	519	338	183	5.660	11.510	7749	5	39.80	11	31.00	
TOB-03	061	07:47										7567							-				haul 5m/min
TOB-03	061	07:51										7543											haul 10m/min
TOB-03	061	08:00	05 4	4.88	11 30.72	5.748	11.512	175	2.3	3740	26	7458	367	3450	183	5.686	11.509	6802	5	41.05	11	30.85	
TOB-03	061	08:30		6.02	11 30.65	5.767	11.511	155	2.4	3742	26	7138	276	3350	182	5.708	11.509	6493	-	42.40		30.70	Winch stopped
TOB-03	061	09:00	05 4		11 30.54	5.787	11.509	165	2.1	3584	26	6946	321	3321	184	5.730	11.505	6291		43.80		30.30	
TOB-03	061	09:18	00 4	1.22	11 00.04	0.707	11.000	100	2.1	0004	20	6687	021	0021	104	0.700	11.000	0201	Ŭ	40.00		00.00	Winch stopped
TOB-03	061	09:30	05 4	8.33	11 30.46	5.806	11.508	187	3.4	3714	26	6687	428	3206	184	5.751	11.504	6058	5	45.00	11	30.70	Which stopped
TOB-03	061	09:47	05 4		11 30.31	5.818	11.505	177	2.3	5714	26	0007	420	5200	104	5.751	11.304	0030	J	43.00		50.70	Start turn
TOB-03	061	09:58		9.46	11 30.32	5.824	11.505	171	1.5		20												On Line 27
TOB-03	061	10:02		9.63	11 30.32	5.824	11.505	165	1.3	3550	27	6687	389	3208	184	5.772	11.501	6057	5	46.30	11	30.40	
TOB-03	061	10:30				5.844	11.503	161	3.4	3444	27	6620			183	5.790	11.500	5970				30.50	Winch stopped
TOB-03	061			0 64	11 30 15																11		
TOB-03		10.36	05 5	0.64	11 30.15	5.644	11.503		3.4	0	27	6620	391	3227	105	0.700	11.500	3970	•	47.20	11	50.50	
108-03	061	10:36									27	6620											Haul 10m/m
	061	11:00	05 5	1.84	11 30.15 11 29.92		11.499				27	6620 6570		3227			11.499	5939	5	47.20 48.95		30.40	
	CD16		05 5 scien	1.84 ce log	11 29.92	5.864					27 Swath/	6570					11.499	5939 ted Posi	5 tion		11		Haul 10m/m
	CD16 SHIP	11:00 9 leg1:	05 5 sciene Latitu	1.84 ce log ide (S)	11 29.92 Longitude (5.864 W)	11.499	186	3.1	3371	27 Swath/ TOBI	6570 TOBI	328	3181	180	5.810	11.499 Plot	5939 ted Posit	5 tion Lat	48.95	11 Lon	30.40	
Operation	CD16 SHIP JD	11:00 9 leg1:	05 5 scien	1.84 ce log ide (S)	11 29.92 Longitude (5.864 W)		186	3.1	3371	27 Swath/ TOBI	6570 TOBI # W/o	328	3181	180	5.810	11.499	5939 ted Posit	5 tion Lat	48.95	11	30.40 Min	Haul 10m/m Comments
Operation TOB-03	CD16 SHIP JD 061	11:00 9 leg1: Time 11:10	05 5 scieno Latitu deg m	1.84 celog ude(S)I nin (11 29.92 Longitude (deg min	5.864 W) Dec.Lat	11.499 Dec.Lon	186 СМG	3.1	3371	27 Swath/ TOBI	6570 TOBI	328	3181	180	5.810	11.499 Plot	5939 ted Posit	5 tion Lat	48.95	11 Lon	30.40 Min	Haul 10m/m Comments Winch stopped
Operation TOB-03 TOB-03	CD16 SHIP JD 061 061	11:00 9 leg1: Time 11:10 11:15	05 5 sciene Latitu	1.84 celog ude(S)I nin (11 29.92 Longitude (5.864 W)	11.499	186	3.1	3371	27 Swath/ TOBI	6570 TOBI # W/o 6481	328	3181	180	5.810	11.499 Plot	5939 ted Posit	5 tion Lat	48.95	11 Lon	30.40 Min	Haul 10m/m Comments Winch stopped Check ship on track
Operation TOB-03 TOB-03 TOB-03	CD16 SHIP JD 061 061 061	11:00 9 leg1: Time 11:10 11:15 11:22	05 5 scienc Latitu deg m 05 5	1.84 ce log ude (S) nin 0 2.42	11 29.92 Longitude (deg min 11 29.82	5.864 W) Dec.Lat 5.874	11.499 Dec.Lon 11.497	186 CMG 175	3.1 SMG	3371 Depth	27 Swath/ TOBI Line	6570 TOBI W/o 6481 6481	328 Alt	3181 z(m)	180 HDG	5.810 Dec.Lat	11.499 Plott Dec.Lor	5939 ted Posit (m) L-bck	5 tion Lat Deg.	48.95 Min	11 Lon Deg	30.40 Min	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min
Operation TOB-03 TOB-03 TOB-03 TOB-03	CD16 SHIP JD 061 061 061 061	11:00 9 leg1: Time 11:10 11:15 11:22 11:30	05 5 scienc Latitu deg m 05 5	1.84 ce log I de (S) nin 2.42 2.94	11 29.92 Longitude (deg min 11 29.82 11 29.72	5.864 W) Dec.Lat 5.874 5.882	11.499 Dec.Lon 11.497 11.495	186 CMG 175 176	3.1 SMG 2.1	3371 Depth 3351	27 Swath/ TOBI Line a 27	6570 TOBI W/o 6481 6364	328 Alt 329	3181 z(m) 3091	180 HDG 178	5.810 Dec.Lat	11.499 Plott Dec.Lor 11.498	5939 ted Posit (m) L-bck 5	5 tion Lat Deg. 5	48.95 Min 50.00	11 Lon Deg	30.40 Min 30.02	Haul 10m/m Comments Winch stopped Check ship on track
Operation TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	CD16 SHIP JD 061 061 061 061 061	11:00 9 leg1: 11:10 11:15 11:22 11:30 12:00	05 5 scienc Latitu deg m 05 5 05 5	1.84 ce log u de (S) nin (C) 2.42 2.94 4.06	11 29.92 Longitude (deg min 11 29.82 11 29.72 11 29.52	5.864 W) Dec.Lat 5.874 5.882 5.901	11.499 Dec.Lon 11.497 11.495 11.492	186 CMG 175 176 175	3.1 SMG 2.1 2.0	3371 Depth 3351 3473	27 Swath/ TOBI Line 27 27 27	6570 TOBI W/o 6481 6481 6364 5913	328 Alt 329 468	3181 z(m) 3091 2898	180 HDG 178 175	5.810 Dec.Lat 5.830 5.853	11.499 Plots Dec.Lor 11.498 11.496	5939 ted Posit (m) L-bck 5753 5344	5 Lat Deg. 5	48.95 Min 50.00 51.25	11 Lon Deg 11	30.40 Min 30.02 29.90	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min
Operation TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	CD16 SHIP JD 061 061 061 061 061 061	11:00 9 leg1: Time 11:10 11:15 11:22 11:30 12:00 12:30	05 5 scienc Latitu deg m 05 5	1.84 ce log u de (S) nin (C) 2.42 2.94 4.06	11 29.92 Longitude (deg min 11 29.82 11 29.72	5.864 W) Dec.Lat 5.874 5.882	11.499 Dec.Lon 11.497 11.495	186 CMG 175 176	3.1 SMG 2.1	3371 Depth 3351	27 Swath/ TOBI Line a 27	6570 TOBI W/o 6481 6481 6364 5913 5452	328 Alt 329	3181 z(m) 3091	180 HDG 178	5.810 Dec.Lat	11.499 Plott Dec.Lor 11.498	5939 ted Posit (m) L-bck 5	5 Lat Deg. 5	48.95 Min 50.00	11 Lon Deg 11	30.40 Min 30.02	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min nephels 0.04
Operation TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	CD16 SHIP JD 061 061 061 061 061 061	11:00 9 leg1: Time 11:10 11:15 11:22 11:30 12:00 12:30 12:45	05 5 scienc Latitu deg m 05 5 05 5	1.84 ce log u de (S) nin (C) 2.42 2.94 4.06	11 29.92 Longitude (deg min 11 29.82 11 29.72 11 29.52	5.864 W) Dec.Lat 5.874 5.882 5.901	11.499 Dec.Lon 11.497 11.495 11.492	186 CMG 175 176 175	3.1 SMG 2.1 2.0	3371 Depth 3351 3473	27 Swath/ TOBI Line 27 27 27	6570 TOBI W/o 6481 6481 6481 6364 5913 5452 5238	328 Alt 329 468	3181 z(m) 3091 2898	180 HDG 178 175	5.810 Dec.Lat 5.830 5.853	11.499 Plots Dec.Lor 11.498 11.496	5939 ted Posit (m) L-bck 5753 5344	5 Lat Deg. 5	48.95 Min 50.00 51.25	11 Lon Deg 11	30.40 Min 30.02 29.90	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min nephels 0.04 stopped winch
Operation TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	CD16 SHIP JD 061 061 061 061 061 061 061	11:00 9 leg1: Time 11:10 11:15 11:22 11:30 12:00 12:30 12:45 12:47	05 5 scienc Latitu deg m 05 5 05 5	1.84 ce log u de (S) nin (C) 2.42 2.94 4.06	11 29.92 Longitude (deg min 11 29.82 11 29.72 11 29.52	5.864 W) Dec.Lat 5.874 5.882 5.901	11.499 Dec.Lon 11.497 11.495 11.492	186 CMG 175 176 175	3.1 SMG 2.1 2.0	3371 Depth 3351 3473	27 Swath/ TOBI Line 27 27 27	6570 TOBI W/o 6481 6481 6364 5913 5452 5238 5238	328 Alt 329 468	3181 z(m) 3091 2898	180 HDG 178 175	5.810 Dec.Lat 5.830 5.853	11.499 Plots Dec.Lor 11.498 11.496	5939 ted Posit (m) L-bck 5753 5344	5 Lat Deg. 5	48.95 Min 50.00 51.25	11 Lon Deg 11	30.40 Min 30.02 29.90	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min nephels 0.04 stopped winch veer at 15 m/min
Operation TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	CD16 SHIP JD 061 061 061 061 061 061 061 061	11:00 9 leg1: Time 11:10 11:15 11:22 11:30 12:00 12:30 12:45 12:47 12:48	05 5 science Latitu deg m 05 5 05 5 05 5	1.84 ce log ide (S) 2.42 2.94 4.06 6.19	11 29.92 Longitude (deg min 11 29.82 11 29.72 11 29.52 11 29.28	5.864 W) Dec.Lat 5.874 5.882 5.901 5.937	11.499 Dec.Lon 11.497 11.495 11.495 11.488	186 CMG 175 176 175 170	3.1 SMG 2.1 2.0 2.1	3371 Depth 3351 3473 3349	27 Swath/ TOBI Line 27 27 27 27	 6570 TOBI W/o 6481 6481 6364 5913 5913 5452 5238 5238 5283 	328 Alt 329 468 594	3181 z(m) 3091 2898 2689	180 HDG 178 175 174	5.810 Dec.Lat 5.830 5.853 5.892	11.499 Plott Dec.Lor 11.498 11.496 11.493	5939 ied Posi (m) L-bck : 5753 5344 4933	5 tion Lat Deg. 5 5 5	48.95 Min 50.00 51.25 52.50	11 Lon Deg 11 11	30.40 Min 30.02 29.90 29.60	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min nephels 0.04 stopped winch
Operation TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	CD16 SHIP JD 061 061 061 061 061 061 061 061 061	11:00 9 leg1: Time 11:10 11:15 11:22 11:30 12:00 12:30 12:45 12:47 12:48 13:00	05 5 scienc Latitu deg m 05 5 05 5	1.84 ce log ide (S) 2.42 2.94 4.06 6.19	11 29.92 Longitude (deg min 11 29.82 11 29.72 11 29.52	5.864 W) Dec.Lat 5.874 5.882 5.901	11.499 Dec.Lon 11.497 11.495 11.492	186 CMG 175 176 175 170	3.1 SMG 2.1 2.0	3371 Depth 3351 3473	27 Swath/ TOBI Line 27 27 27	6570 TOBI W/o 6481 6481 6364 5913 5452 5238 5238 5283 5547	328 Alt 329 468	3181 z(m) 3091 2898	180 HDG 178 175	5.810 Dec.Lat 5.830 5.853	11.499 Plots Dec.Lor 11.498 11.496	5939 ted Posit (m) L-bck 5753 5344	5 tion Lat Deg. 5 5 5	48.95 Min 50.00 51.25	11 Lon Deg 11 11	30.40 Min 30.02 29.90	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min nephels 0.04 stopped winch veer at 15 m/min Veer at 20 m/min
Operation TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	CD16 SHIP JD 061 061 061 061 061 061 061 061 061 061	11:00 9 leg1: Time 11:10 11:15 11:22 11:30 12:00 12:30 12:45 12:47 12:48 13:00 13:15	05 5 science Latitu deg m 05 5 05 5 05 5	1.84 ce log ide (S) 2.42 2.94 4.06 6.19	11 29.92 Longitude (deg min 11 29.82 11 29.72 11 29.52 11 29.28	5.864 W) Dec.Lat 5.874 5.882 5.901 5.937	11.499 Dec.Lon 11.497 11.495 11.495 11.488	186 CMG 175 176 175 170	3.1 SMG 2.1 2.0 2.1	3371 Depth 3351 3473 3349	27 Swath/ TOBI Line 27 27 27 27	6570 TOBI W/o 6481 6481 6481 6481 6364 5913 5452 5238 5238 5283 5547 5812	328 Alt 329 468 594	3181 z(m) 3091 2898 2689	180 HDG 178 175 174	5.810 Dec.Lat 5.830 5.853 5.892	11.499 Plott Dec.Lor 11.498 11.496 11.493	5939 ied Posi (m) L-bck : 5753 5344 4933	5 tion Lat Deg. 5 5 5	48.95 Min 50.00 51.25 52.50	11 Lon Deg 11 11	30.40 Min 30.02 29.90 29.60	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min nephels 0.04 stopped winch veer at 15 m/min Veer at 20 m/min veer at 10 m/min
Operation TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	CD16 SHIP JD 061 061 061 061 061 061 061 061 061 061	11:00 9 leg1: 11:10 11:15 11:22 11:30 12:00 12:30 12:45 12:47 12:48 13:00 13:15 13:18	05 5 scienc Latitu deg m 05 5 05 5 05 5 05 5	1.84 ce log ide (S) nin 2.42 2.94 4.06 6.19 6.41	11 29.92 Longitude (deg min 11 29.82 11 29.72 11 29.52 11 29.28 11 29.28 11 29.207	5.864 W) Dec.Lat 5.874 5.882 5.901 5.937 5.940	11.499 Dec.Lon 11.497 11.495 11.492 11.488 11.485	186 CMG 175 176 175 170 180	3.1 SMG 2.1 2.0 2.1 2.4	3371 Depth 3351 3473 3349 3407	27 Swath/ TOBI Line 1 27 27 27 27 27	6570 TOBI W/o 6481 6481 6481 6481 6364 5913 5452 5238 5238 5238 5247 5812 5833	328 Alt 329 468 594 709	3181 z(m) 3091 2898 2689 2736	180 HDG 178 175 174 178	5.810 Dec.Lat 5.830 5.853 5.892 5.895	11.499 Plott Dec.Lor 11.498 11.496 11.493 11.486	5939 ied Posir (m) L-bck : 5753 5344 4933 5015	5 tion Lat Deg. 5 5 5	48.95 Min 50.00 51.25 52.50 53.70	11 Lon Deg 11 11 11	30.40 Min 30.02 29.90 29.60 29.40	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min nephels 0.04 stopped winch veer at 15 m/min Veer at 20 m/min
Operation TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	CD16 SHIP JD 061 061 061 061 061 061 061 061 061 061	11:00 9 leg1: Time 11:10 11:15 11:22 11:30 12:30 12:45 12:47 12:48 13:00 13:15 13:18 13:30	05 5 sciena Latitu deg n 05 5 05 5 05 5 05 5 05 5	1.84 ce log ude (S) 1.2.42 2.94 4.06 6.19 6.41 7.56	11 29.92 Longitude (deg min 11 11 29.82 11 29.72 11 29.28 11 29.28 11 29.07 11 28.87	5.864 W) Dec.Lat 5.874 5.882 5.901 5.937 5.940 5.959	11.499 Dec.Lon 11.497 11.495 11.492 11.488 11.485 11.485	186 CMG 175 176 175 170 180 172	3.1 SMG 2.1 2.0 2.1 2.4 2.0	3371 Depth 3351 3473 3349 3407 3222	27 Swath/ TOBI Line 27 27 27 27 27 27	6570 W/o 6481 6481 6364 5913 5452 5238 5238 5238 5283 5547 5812 5833 5832	328 Alt 329 468 594 709 564	3181 z(m) 3091 2898 2689 2736 2868	180 HDG 178 175 174 178 177	5.810 Dec.Lat 5.830 5.853 5.892 5.895 5.895	11.499 Plott Dec.Lor 11.498 11.496 11.493 11.486	5939 ted Posit (m) L-bck : 5753 5344 4933 5015 5268	5 tion Lat Deg. 5 5 5 5	48.95 Min 50.00 51.25 52.50 53.70 54.80	11 Lon Deg 11 11 11	30.40 Min 30.02 29.90 29.60 29.40 29.10	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min nephels 0.04 stopped winch veer at 15 m/min Veer at 20 m/min veer at 10 m/min
Operation TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	CD16 SHIP JD 061 061 061 061 061 061 061 061 061 061	11:00 9 leg1: Time 11:10 11:15 11:22 11:30 12:00 12:30 12:45 12:47 12:48 13:00 13:15 13:18 13:30 14:00	05 5 scient Latitu deg n 05 5 05 5 05 5 05 5 05 5 05 5 05 5 05	1.84 ce log ude (S) 2.42 2.94 4.06 6.19 6.41 7.56 8.72	11 29.92 Longitude (deg min 11 11 29.82 11 29.82 11 29.52 11 29.28 11 29.07 11 29.07 11 28.87 11 28.66	5.864 W) Dec.Lat 5.874 5.882 5.901 5.937 5.940 5.959 5.979	11.499 Dec.Lon 11.497 11.495 11.492 11.488 11.485 11.485	186 CMG 175 176 175 170 180 172 172	3.1 SMG 2.1 2.0 2.1 2.4 2.0 2.6	3371 Depth 3351 3473 3349 3407 3222 3188	27 Swath/ TOBI Line 1 27 27 27 27 27 27 27 27 27 27 27 27 27	6570 TOBI W (0) 6481 6481 6481 6481 6481 5913 5452 5238 5283 5547 5812 5833 5832 5831	329 468 594 709 564 455	3181 z(m) 3091 2898 2689 2736 2736 2868 2835	180 HDG 178 175 174 178 1774 174	5.810 Dec.Lat 5.830 5.853 5.892 5.895 5.895 5.912 5.931	11.499 Plott Dec.Lor 11.498 11.496 11.493 11.486 11.486 11.486	5939 (m) L-bck : 5753 5344 4933 5015 5268 5285	5 tion Lat Deg. 5 5 5 5 5 5 5 5	48.95 Min 50.00 51.25 52.50 53.70 54.80 55.80	11 Lon Deg 11 11 11 11	30.40 Min 30.02 29.90 29.60 29.40 29.10 29.10	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min nephels 0.04 stopped winch veer at 15 m/min Veer at 20 m/min veer at 10 m/min
Operation TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	CD16 SHIP JD 061 061 061 061 061 061 061 061 061 061	11:00 9 leg1: Time 11:10 11:15 11:22 11:30 12:00 12:30 12:45 12:47 12:48 13:00 13:15 13:18 13:30 14:00 14:30	05 5 sciena Latitu deg n 05 5 05 5 05 5 05 5 05 5	1.84 ce log ude (S) 2.42 2.94 4.06 6.19 6.41 7.56 8.72	11 29.92 Longitude (deg min 11 11 29.82 11 29.72 11 29.23 11 29.24 11 29.25 11 29.26 11 29.28 11 29.07 11 28.87	5.864 W) Dec.Lat 5.874 5.882 5.901 5.937 5.940 5.959	11.499 Dec.Lon 11.497 11.495 11.492 11.488 11.485 11.485	186 CMG 175 176 175 170 180 172	3.1 SMG 2.1 2.0 2.1 2.4 2.4	3371 Depth 3351 3473 3349 3407 3222	27 Swath/ TOBI Line 27 27 27 27 27 27	6570 W /o 6481 6481 6481 6481 6481 65913 5452 5238 5283 5547 5812 5833 5547 5812 5833 5832 5832 5832 5832	328 Alt 329 468 594 709 564	3181 z(m) 3091 2898 2689 2736 2868	180 HDG 178 175 174 178 177	5.810 Dec.Lat 5.830 5.853 5.892 5.895 5.895	11.499 Plott Dec.Lor 11.498 11.496 11.493 11.486	5939 ted Posit (m) L-bck : 5753 5344 4933 5015 5268	5 tion Lat Deg. 5 5 5 5 5 5 5 5	48.95 Min 50.00 51.25 52.50 53.70 54.80	11 Lon Deg 11 11 11 11	30.40 Min 30.02 29.90 29.60 29.40 29.10	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min nephels 0.04 stopped winch veer at 15 m/min Veer at 20 m/min stop winch
Operation TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	CD16 SHIP JD 061 061 061 061 061 061 061 061 061 061	11:00 9 leg1: Time 11:10 11:15 11:22 11:30 12:00 12:45 12:47 12:48 13:00 13:15 13:18 13:30 14:00 14:30 14:34	05 5 scient Latitu deg n 05 5 05 5 05 5 05 5 05 5 05 5 05 5 05	1.84 ce log ude (S) 2.42 2.94 4.06 6.19 6.41 7.56 8.72	11 29.92 Longitude (deg min 11 11 29.82 11 29.82 11 29.52 11 29.28 11 29.07 11 29.07 11 28.87 11 28.66	5.864 W) Dec.Lat 5.874 5.882 5.901 5.937 5.940 5.959 5.979	11.499 Dec.Lon 11.497 11.495 11.492 11.488 11.485 11.485	186 CMG 175 176 175 170 180 172 172	3.1 SMG 2.1 2.0 2.1 2.4 2.0 2.6	3371 Depth 3351 3473 3349 3407 3222 3188	27 Swath/ TOBI Line 1 27 27 27 27 27 27 27 27 27 27 27 27 27	6570 TOBI W/o 6481 6481 6364 5913 5452 5238 5238 5238 5238 5233 5832 5833 5832 5831 5829 5829	329 468 594 709 564 455	3181 z(m) 3091 2898 2689 2736 2736 2868 2835	180 HDG 178 175 174 178 1774 174	5.810 Dec.Lat 5.830 5.853 5.892 5.895 5.895 5.912 5.931	11.499 Plott Dec.Lor 11.498 11.496 11.493 11.486 11.486 11.486	5939 (m) L-bck : 5753 5344 4933 5015 5268 5285	5 tion Lat Deg. 5 5 5 5 5 5 5 5	48.95 Min 50.00 51.25 52.50 53.70 54.80 55.80	11 Lon Deg 11 11 11 11	30.40 Min 30.02 29.90 29.60 29.40 29.10 29.10	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min nephels 0.04 stopped winch veer at 15 m/min Veer at 20 m/min veer at 10 m/min stop winch haul at 10 m/min
Operation TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	CD16 SHIP JD 061 061 061 061 061 061 061 061 061 061	11:00 9 leg1: Time 11:10 11:15 11:22 11:30 12:00 12:30 12:30 12:47 12:48 13:00 13:15 13:18 13:00 14:30 14:30	05 5 scient Latitu deg n 05 5 05 5 05 5 05 5 05 5 05 5 05 5 05	1.84 ce log ude (S) 2.42 2.94 4.06 6.19 6.41 7.56 8.72	11 29.92 Longitude (deg min 11 11 29.82 11 29.82 11 29.52 11 29.28 11 29.07 11 29.07 11 28.87 11 28.66	5.864 W) Dec.Lat 5.874 5.882 5.901 5.937 5.940 5.959 5.979	11.499 Dec.Lon 11.497 11.495 11.492 11.488 11.485 11.485	186 CMG 175 176 175 170 180 172 172	3.1 SMG 2.1 2.0 2.1 2.4 2.0 2.6	3371 Depth 3351 3473 3349 3407 3222 3188	27 Swath/ TOBI Line 1 27 27 27 27 27 27 27 27 27 27 27 27 27	6570 TOBI W (0) 6481 6481 6364 5913 5452 5238 5238 5238 5547 5812 5832 5832 5832 5831 5832 58	329 468 594 709 564 455	3181 z(m) 3091 2898 2689 2736 2736 2868 2835	180 HDG 178 175 174 178 1774 174	5.810 Dec.Lat 5.830 5.853 5.892 5.895 5.895 5.912 5.931	11.499 Plott Dec.Lor 11.498 11.496 11.493 11.486 11.486 11.486	5939 (m) L-bck : 5753 5344 4933 5015 5268 5285	5 tion Lat Deg. 5 5 5 5 5 5 5 5	48.95 Min 50.00 51.25 52.50 53.70 54.80 55.80	11 Lon Deg 11 11 11 11	30.40 Min 30.02 29.90 29.60 29.40 29.10 29.10	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min nephels 0.04 stopped winch veer at 15 m/min Veer at 20 m/min stop winch haul at 10 m/min stop winch
Operation TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	CD16 SHIP JD 061 061 061 061 061 061 061 061 061 061	11:00 9 leg1: Time 11:10 11:15 11:22 11:30 12:30 12:45 12:47 12:48 13:30 13:15 13:18 13:30 14:00 14:30 14:34 14:43 14:48	05 5 scient Latitu deg n 05 5 05 5 05 5 05 5 05 5 05 5 05 5 05	1.84 ce log ude (S) 2.42 2.94 4.06 6.19 6.41 7.56 8.72	11 29.92 Longitude (deg min 11 11 29.82 11 29.82 11 29.52 11 29.28 11 29.07 11 29.07 11 28.87 11 28.66	5.864 W) Dec.Lat 5.874 5.882 5.901 5.937 5.940 5.959 5.979	11.499 Dec.Lon 11.497 11.495 11.492 11.488 11.485 11.485	186 CMG 175 176 175 170 180 172 172	3.1 SMG 2.1 2.0 2.1 2.4 2.0 2.6	3371 Depth 3351 3473 3349 3407 3222 3188	27 Swath/ TOBI Line 1 27 27 27 27 27 27 27 27 27 27 27 27 27	 6570 TOBI W/o 6481 6481 6364 5913 5452 5238 5238 5547 5812 5833 5842 5831 5829 5829 5829 5739 5739 	329 468 594 709 564 455	3181 z(m) 3091 2898 2689 2736 2736 2868 2835	180 HDG 178 175 174 178 1774 174	5.810 Dec.Lat 5.830 5.853 5.892 5.895 5.895 5.912 5.931	11.499 Plott Dec.Lor 11.498 11.496 11.493 11.486 11.486 11.486	5939 (m) L-bck : 5753 5344 4933 5015 5268 5285	5 tion Lat Deg. 5 5 5 5 5 5 5 5	48.95 Min 50.00 51.25 52.50 53.70 54.80 55.80	11 Lon Deg 11 11 11 11	30.40 Min 30.02 29.90 29.60 29.40 29.10 29.10	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min nephels 0.04 stopped winch veer at 15 m/min Veer at 20 m/min stop winch haul at 10 m/min stop winch haul at 10 m/min
Operation TOB-03	CD16 SHIP JD 061 061 061 061 061 061 061 061 061 061	11:00 9 leg1: 11:10 11:12 11:22 11:30 12:30 12:30 12:45 12:47 12:48 13:00 13:15 13:18 13:30 14:30 14:30 14:34 14:48 14:48	05 5 science Latitu deg r 05 5 5 5 05 5 05 5 05 5 05 5 05 5 05	1.84 cc log ude (S) inin c 2.42 2.94 4.06 6.19 6.41 7.56 8.72 9.84	11 29.92 Longitude (deg min 11 29.82 11 29.72 11 29.52 11 29.28 11 29.07 11 29.07 11 28.87 11 28.35	5.864 W) Dec.Lat 5.874 5.882 5.901 5.937 5.940 5.959 5.979 5.997	11.499 Dec.Lon 11.497 11.495 11.492 11.488 11.485 11.485 11.473	186 CMG 175 176 175 170 180 172 172 172 174	3.1 SMG 2.1 2.0 2.1 2.4 2.4 2.6 2.4	3371 Depth 3351 3473 3349 3407 3222 3188 3167	27 Swath/ TOBI 27 27 27 27 27 27 27 27 27 27	6570 TOBI W/o 6481 6481 6481 6364 5913 5452 5238 5238 5283 5283 5832 5833 5832 5833 5832 5833 5832 5839 5839 5839 5655	328 Alt 329 468 594 709 564 455 407	3181 z(m) 3091 2898 2689 2736 2868 2835 2871	180 HDG 178 175 174 178 174 174 174	5.810 Dec.Lat 5.830 5.853 5.892 5.895 5.912 5.931 5.950	11.499 Plott Dec.Lor 11.498 11.496 11.493 11.486 11.486 11.483 11.476	5939 ied Posi (m) L-bck : 5753 5344 4933 5015 5268 5263	5 tion Lat Deg. 5 5 5 5 5 5 5 5 5 5	48.95 Min 50.00 51.25 52.50 53.70 54.80 55.80 57.30	11 Lon Deg 11 11 11 11 11 11	30.40 Min 30.02 29.90 29.60 29.40 29.10 29.10 28.70	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min nephels 0.04 stopped winch veer at 15 m/min Veer at 20 m/min stop winch haul at 10 m/min stop winch
Operation TOB-03	CD16 SHIP JD 061 061 061 061 061 061 061 061 061 061	11:00 9 Jeg1: Time 11:10 11:15 11:22 11:30 12:00 12:30 12:45 12:47 12:47 12:48 13:30 13:16 13:18 13:30 14:30 14:30 14:30 14:34 14:34 14:34 14:34 14:54 15:03	05 5 scient Latitu deg n 05 5 05 5 05 5 05 5 05 5 05 5 05 5 05	1.84 cc log ude (S) inin c 2.42 2.94 4.06 6.19 6.41 7.56 8.72 9.84	11 29.92 Longitude (deg min 11 11 29.82 11 29.82 11 29.52 11 29.28 11 29.07 11 29.07 11 28.87 11 28.66	5.864 W) Dec.Lat 5.874 5.882 5.901 5.937 5.940 5.959 5.979	11.499 Dec.Lon 11.497 11.495 11.492 11.488 11.485 11.485 11.473	186 CMG 175 176 175 170 180 172 172 174	3.1 SMG 2.1 2.0 2.1 2.4 2.4 2.6 2.4	3371 Depth 3351 3473 3349 3407 3222 3188	27 Swath/ TOBI Line 1 27 27 27 27 27 27 27 27 27 27 27 27 27	6570 TOBI W (0) 6481 6481 6364 5913 5452 5238 5238 5238 5547 5813 5832 5833 5832 5833 5832 5833 5832 5833 5832 5833 5835 5835 5835 5836 5846 58	329 468 594 709 564 455	3181 z(m) 3091 2898 2689 2736 2736 2868 2835	180 HDG 178 175 174 178 1774 174	5.810 Dec.Lat 5.830 5.853 5.892 5.895 5.895 5.912 5.931	11.499 Plott Dec.Lor 11.498 11.496 11.493 11.486 11.486 11.486	5939 ied Posi (m) L-bck : 5753 5344 4933 5015 5268 5263	5 tion Lat Deg. 5 5 5 5 5 5 5 5 5 5	48.95 Min 50.00 51.25 52.50 53.70 54.80 55.80	11 Lon Deg 11 11 11 11 11 11	30.40 Min 30.02 29.90 29.60 29.40 29.10 29.10	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min nephels 0.04 stopped winch veer at 15 m/min Veer at 20 m/min veer at 10 m/min stop winch haul at 10 m/min haul at 10 m/min haul at 20 m/min
Operation TOB-03	CD16 SHIP JD 061 061 061 061 061 061 061 061 061 061	11:00 9 leg1: 11:10 11:12 11:22 11:30 12:30 12:30 12:45 12:47 12:48 13:00 13:15 13:18 13:30 14:30 14:30 14:34 14:48 14:48	05 5 science Latitu deg r 05 5 5 5 05 5 05 5 05 5 05 5 05 5 05	1.84 cc log ude (S) inin c 2.42 2.94 4.06 6.19 6.41 7.56 8.72 9.84	11 29.92 Longitude (deg min 11 29.82 11 29.72 11 29.52 11 29.28 11 29.07 11 29.07 11 28.87 11 28.35	5.864 W) Dec.Lat 5.874 5.882 5.901 5.937 5.940 5.959 5.979 5.997	11.499 Dec.Lon 11.497 11.495 11.492 11.488 11.485 11.485 11.473	186 CMG 175 176 175 170 180 172 172 172 174	3.1 SMG 2.1 2.0 2.1 2.4 2.4 2.6 2.4	3371 Depth 3351 3473 3349 3407 3222 3188 3167	27 Swath/ TOBI 27 27 27 27 27 27 27 27 27 27	6570 TOBI W/o 6481 6481 6481 6481 6364 5913 5452 5238 5238 5283 5547 5812 5833 5832 5833 5832 5833 5832 5839 5739 5739 5739 5665	328 Alt 329 468 594 709 564 455 407	3181 z(m) 3091 2898 2689 2736 2868 2835 2871	180 HDG 178 175 174 178 174 174 174	5.810 Dec.Lat 5.830 5.853 5.892 5.895 5.912 5.931 5.950	11.499 Plott Dec.Lor 11.498 11.496 11.493 11.486 11.486 11.483 11.476	5939 ied Posi (m) L-bck : 5753 5344 4933 5015 5268 5263	5 tion Lat Deg. 5 5 5 5 5 5 5 5 5 5	48.95 Min 50.00 51.25 52.50 53.70 54.80 55.80 57.30	11 Lon Deg 11 11 11 11 11 11	30.40 Min 30.02 29.90 29.60 29.40 29.10 29.10 28.70	Haul 10m/m Comments Winch stopped Check ship on track haul 15m/min nephels 0.04 stopped winch veer at 15 m/min Veer at 20 m/min stop winch haul at 10 m/min stop winch haul at 10 m/min

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TOB-03	061	15:30	06 0			27.69	6.033	11.462	150	1.8	3047	27				2594	169	5.992	11.469	4572		59.50		28.20	
TOB-03	061	16:00	06 0	3.14	11	27.35	6.052	11.456	162	2.3	2950	27			142	2581	164	6.012	11.467	4581	6	1.00	11	27.85	
TOB-03	061	16:11												5093											haul 10m/min
TOB-03	061	16:22												4987											winch stopped
TOB-03	061	16:30	06 0	4.15	11	27.03	6.069	11.451	164	1.8	2963	27			405	2591	171	6.029	11.457	4451	6	1.85	11	27.50	
TOB-03	061	16:45												4986											haul 10m/min
TOB-03	061	17:00	06 0	5.21	11	26.65	6.087	11.444	170	2.2	2964	27		4852	396	2551	169	6.048	11.452	4317	6	3.00	11	27.20	
TOB-03	061	17:13												4852											veer 10m/min
TOB-03	061	17:26												4957											winch stopped
TOB-03	061	17:30	06 0	6.32	11	26.27	6.105	11.438	158	2.6	3001	27		4958	411	2551	166	6.066	11.448	4441	6	3.70	11	26.70	
TOB-03	061	17:44												4957											haul 15m/min
TOB-03	061	18:00	06 0	7.44	11	25.91	6.124	11.432	160	2.3	3043	27		4736	406	2410	162	6.087	11.444	4267	6	5.20	11	26.50	Stop winch
TOB-03	061	18:23					-	-		-				4736		-					-				veer 10m/min
TOB-03	061	18:30	06 0	8.55	11	25.55	6.143	11.426	160	3.2	3070	27			488	2420	165	6.105	11.436	4324	6	5.90	11	26.25	veer 15m/min
TOB-03	061	18:39								•				4923							-				winch stopped
TOB-03	061	19:00	06 0	9.67	11	25.20	6.161	11.420	167	2.7	3254	27			140	2463	168	6.122	11.429	4453	6	7.10	11	25.95	
TOB-03	061	19:26	0000	0.07		20.20	0.101	11.420	107	2.1	0204	21		4923		2400	100	0.122	11.420	4400	Ŭ			20.00	veer 15m/min
TOB-03	061	19:30	06 1	0.94	11	24.83	6.181	11.414	166	3.4	3232	27			553	2445	170	6.140	11.421	4538	6	8.60	11	25.55	veer romannin
TOB-03	061	20:00	06 1			24.47	6.200	11.408	150	2.8	3364	27					171	6.155	11.415	4948		9.50		25.15	
TOB-03	061	20:00	001	1.90		24.47	0.200	11.400	150	2.0	3304	21		5741	+05	2030	17.1	0.155	11.415	4340	0	9.50		25.15	winch stannad
TOB-03	061		06 4	2.12	4.4	24.00	6 210	11.402	150	24	3070	27		5741	128	2759	169	6.172	44 444	5225		10.30		24.70	winch stopped
TOB-03		20:30 21:00	06 1 06 1			24.09 23.78	6.219 6.236	11.396	150 156	2.1	3254	27					171	6.172	11.411	5225		11.30		24.70	
	061		06 1	4.16	11	23.78	6.236	11.396	156	1.5	3254	21			417	2788	171	6.189	11.404	5206	6	11.30	11	24.60	
TOB-03	061	21:20												5739											Haul 10 m/min
TOB-03	061	21:30	06 1			23.36	6.255	11.389	158	1.8	3321	27				2782	168	6.210	11.399	5078		12.70		24.30	
TOB-03	061	22:00	06 1	6.44	11	23.03	6.274	11.384	167	2.0	3293	27			452	2676	168	6.230	11.393	4954	6	13.90	11	23.80	
TOB-03	061	22:05												5464											Veer 10 m/m
TOB-03	061	22:30	06 1	7.54	11	22.70	6.292	11.378	168	2.5	3342	27			461	2777	168	6.246	11.388	5195	6	14.90	11	23.50	
TOB-03	061	22:40												5831											winch stopped
TOB-03	061	23:00	06 1	8.59	11	22.36	6.310	11.373	157	2.8	3472	27		5832	245	2905	172	6.263	11.379	5247	6	15.80	11	23.20	
TOB-03	061	23:05												5832											haul 15m/min
TOB-03	061	23:13												5714											decrease haul 10 m/m
TOB-03	061	23:19												5658											winch stopped
				0.00		21.96	0.000				0055	07					170	6.282	11.374	5085	6	17.20	11	23.00	
TOB-03	061	23:30	06 1	9.68	-11	21.90	6.328	11.366	160	2.0	3355	27		5658	441	2838	170	0.202	11.374			17.20			
	061 062	23:30 00:00	06 1 06 2			21.96	6.328 6.346	11.366 11.361	160 173	2.0 2.6	3355 3361	27 27				2838 2904	170	6.292	11.367	5214		18.00		22.80	
TOB-03 TOB-03	062	00:00	06 2	0.78	11	21.64	6.346	11.361	173	2.6	3361	27		5803	397	2904	172	6.299	11.367	5214	6	18.00	11	22.80	
TOB-03				0.78 1.86	11 11	21.64 21.29			173 158					5803 5802	397 355	2904					6 6		11 11		
TOB-03 TOB-03 TOB-03 TOB-03	062 062 062	00:00 00:30 01:00	06 2 06 2	0.78 1.86	11 11	21.64	6.346 6.364	11.361 11.355	173	2.6 2.6	3361 3564	27 27		5803 5802 5801	397 355	2904 2950	172 172	6.299 6.318	11.367 11.361	5214 5186	6 6	18.00 18.90	11 11	22.80 22.20	haul at 25 m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	062 062 062 062	00:00 00:30 01:00 01:17	06 2 06 2 06 2	20.78 21.86 22.85	11 11	21.64 21.29	6.346 6.364	11.361 11.355	173 158	2.6 2.6	3361 3564	27 27 27		5803 5802	397 355	2904 2950	172 172	6.299 6.318	11.367 11.361 11.360	5214 5186 5162	6 6 6	18.00 18.90	11 11	22.80 22.20	haul at 25 m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	062 062 062 062 CD16	00:00 00:30 01:00 01:17 9 leg1:	06 2 06 2 06 2 scien	20.78 21.86 22.85 ce log	11 11 11	21.64 21.29 20.98	6.346 6.364 6.381	11.361 11.355	173 158	2.6 2.6	3361 3564	27 27 27 Swath/		5803 5802 5801 5801	397 355	2904 2950	172 172	6.299 6.318	11.367 11.361 11.360	5214 5186 5162 ted Posi	6 6 6	18.00 18.90 20.10	11 11	22.80 22.20 21.80	•
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	062 062 062 062 CD16 SHIP	00:00 00:30 01:00 01:17 39 leg1:	06 2 06 2 06 2 scient	20.78 21.86 22.85 ce log ude (S)I	11 11 11 Long	21.64 21.29 20.98 gitude (6.346 6.364 6.381 W)	11.361 11.355 11.350	173 158 155	2.6 2.6 1.7	3361 3564 3546	27 27 27 Swath/	ļ	5803 5802 5801 5801 5801	397 355 431	2904 2950 2989	172 172 167	6.299 6.318 6.335	11.367 11.361 11.360 Plote	5214 5186 5162 ted Posi (m)	6 6 ition Lat	18.00 18.90 20.10	11 11 11 Lon	22.80 22.20 21.80	haul at 25 m/min Comments
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 Operation	062 062 062 062 CD16 SHIP JD	00:00 00:30 01:00 01:17 i9 leg1: Time	06 2 06 2 06 2 scient	20.78 21.86 22.85 ce log ude (S)I	11 11 11 Long	21.64 21.29 20.98 gitude (6.346 6.364 6.381 W)	11.361 11.355	173 158 155	2.6 2.6 1.7	3361 3564 3546	27 27 27 Swath/	#	5803 5802 5801 5801 5801 TOBI W/o	397 355 431	2904 2950 2989	172 172 167	6.299 6.318 6.335	11.367 11.361 11.360	5214 5186 5162 ted Posi (m)	6 6 ition Lat	18.00 18.90 20.10	11 11 11	22.80 22.20 21.80	Comments
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 Operation TOB-03	062 062 062 CD16 SHIP JD 062	00:00 00:30 01:00 01:17 39 leg1: Time 01:26	06 2 06 2 06 2 scient	20.78 21.86 22.85 ce log ude (S)I	11 11 11 Long	21.64 21.29 20.98 gitude (6.346 6.364 6.381 W)	11.361 11.355 11.350	173 158 155	2.6 2.6 1.7	3361 3564 3546	27 27 27 Swath/	#	5803 5802 5801 5801 TOBI W/o 5547	397 355 431	2904 2950 2989	172 172 167	6.299 6.318 6.335	11.367 11.361 11.360 Plote	5214 5186 5162 ted Posi (m)	6 6 ition Lat	18.00 18.90 20.10	11 11 11 Lon	22.80 22.20 21.80	Comments haul at 10 m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 Operation TOB-03 TOB-03	062 062 062 CD16 SHIP JD 062 062	00:00 00:30 01:00 01:17 39 leg1: Time 01:26 01:27	06 2 06 2 06 2 scien Latitu deg n	20.78 21.86 22.85 ce log J de (S)I	11 11 11 Long	21.64 21.29 20.98 gitude (min	6.346 6.364 6.381 W) Dec.Lat	11.361 11.355 11.350 Dec.Lon	173 158 155 CMG	2.6 2.6 1.7	3361 3564 3546 Depth	27 27 27 Swath/ TOBI Line	#	5803 5802 5801 5801 5801 TOBI W/o 5547 5538	397 355 431	2904 2950 2989 z(m)	172 172 167 HDG	6.299 6.318 6.335 Dec.Lat	11.367 11.361 11.360 Plott Dec.Lor	5214 5186 5162 ted Posi (m) L-bck	6 6 ition Lat Deg.	18.00 18.90 20.10 Min	11 11 11 Lon Deg	22.80 22.20 21.80 Min	Comments
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	062 062 062 062 CD16 SHIP JD 062 062 062	00:00 00:30 01:00 01:17 9 leg1: Time 01:26 01:27 01:30	06 2 06 2 06 2 scient	20.78 21.86 22.85 ce log J de (S)I	11 11 11 Long	21.64 21.29 20.98 gitude (6.346 6.364 6.381 W)	11.361 11.355 11.350	173 158 155	2.6 2.6 1.7	3361 3564 3546	27 27 27 Swath/	#	5803 5802 5801 5801 TOBI W/0 5547 5538 5538	397 355 431	2904 2950 2989 z(m)	172 172 167	6.299 6.318 6.335	11.367 11.361 11.360 Plote	5214 5186 5162 ted Posi (m)	6 6 ition Lat Deg.	18.00 18.90 20.10	11 11 11 Lon Deg	22.80 22.20 21.80	Comments haul at 10 m/min stopped winch
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	062 062 062 CD16 SHIP JD 062 062 062 062	00:00 00:30 01:00 01:17 59 leg1: Time 01:26 01:27 01:30 01:51	06 2 06 2 06 2 scien Latitu deg n	10.78 11.86 12.85 ce log ude (S)I nin o	11 11 Long deg	21.64 21.29 20.98 gitude (min 20.60	6.346 6.364 6.381 W) Dec.Lat 6.399	11.361 11.355 11.350 Dec.Lon 11.343	173 158 155 CMG 155	2.6 2.6 1.7 SMG 2.5	3361 3564 3546 Depth 3552	27 27 27 Swath/ TOBI Line 27	#	5803 5802 5801 5801 TOBI W/0 5547 5538 5538 5538	397 : 355 : 431 : Alt 539 :	2904 2950 2989 z(m) 2862	172 172 167 HDG 171	6.299 6.318 6.335 Dec.Lat 6.355	11.367 11.361 11.360 Plott Dec.Lor 11.350	5214 5186 5162 ted Posi (m) L-bck 4931	6 6 ition Lat Deg. 6	18.00 18.90 20.10 Min 21.35	11 11 11 Lon Deg	22.80 22.20 21.80 Min 21.47	Comments haul at 10 m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	062 062 062 CD16 SHIP JD 062 062 062 062 062	00:00 01:00 01:17 09 leg1: Time 01:26 01:27 01:30 01:51 02:00	06 2 06 2 06 2 scien Latitu deg n	10.78 11.86 12.85 ce log ude (S)I nin o	11 11 Long deg	21.64 21.29 20.98 gitude (min	6.346 6.364 6.381 W) Dec.Lat	11.361 11.355 11.350 Dec.Lon	173 158 155 CMG	2.6 2.6 1.7	3361 3564 3546 Depth	27 27 27 Swath/ TOBI Line	#	5803 5802 5801 5801 TOBI W/0 5547 5538 5538 5538 5538 5538	397 : 355 : 431 : Alt 539 :	2904 2950 2989 z(m)	172 172 167 HDG	6.299 6.318 6.335 Dec.Lat	11.367 11.361 11.360 Plott Dec.Lor	5214 5186 5162 ted Posi (m) L-bck	6 6 ition Lat Deg. 6	18.00 18.90 20.10 Min	11 11 11 Lon Deg	22.80 22.20 21.80 Min	Comments haul at 10 m/min stopped winch Chucking out at 15m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	062 062 062 CD16 SHIP JD 062 062 062 062 062 062	00:00 01:00 01:17 09 leg1: Time 01:26 01:27 01:30 01:51 02:00 02:28	06 2 06 2 06 2 scient Latitu deg n 06 2 06 2	10.78 11.86 12.85 ce log Jude (S)I nin co 13.94	11 11 11 Long deg 11	21.64 21.29 20.98 gitude (min 20.60 20.23	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419	11.361 11.355 11.350 Dec.Lon 11.343 11.337	173 158 155 CMG 155 171	2.6 2.6 1.7 SMG 2.5 2.4	3361 3564 3546 Depth 3552 3521	27 27 27 Swath/ TOBI Line 27 27	#	5803 5802 5801 5801 TOBI W/0 5547 5538 5538 5538 5675 6106	397 : 355 : 431 : Alt 539 : 653 :	2904 2950 2989 z(m) 2862 2830	172 172 167 HDG 171 164	6.299 6.318 6.335 Dec.Lat 6.355 6.374	11.367 11.361 11.360 Plott Dec.Lor 11.350 11.350	5214 5186 5162 ted Posi (m) L-bck 4931 5109	6 6 ition Lat Deg. 6	18.00 18.90 20.10 Min 21.35 22.50	11 11 11 Lon Deg 11	22.80 22.20 21.80 Min 21.47 21.00	Comments haul at 10 m/min stopped winch
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	062 062 062 CD16 SHIP JD 062 062 062 062 062 062 062 062	00:00 01:00 01:17 09 leg1: Time 01:26 01:27 01:30 01:51 02:00 02:28 02:30	06 2 06 2 scient Latitu deg n 06 2 06 2	20.78 11.86 12.85 ce log ude (S)I nin c 13.94 15.11	11 11 11 11 Long deg 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23 19.87	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419 6.440	11.361 11.355 11.350 Dec.Lon 11.343 11.337 11.331	173 158 155 CMG 155 171 168	2.6 2.6 1.7 SMG 2.5 2.4 2.7	3361 3564 3546 Depth 3552 3521 3525	27 27 27 Swath/ TOBI Line 27 27 27	#	5803 5802 5801 5801 TOBI W/0 5547 5538 5538 5538 5538 5675 6106 6106	 397 355 431 Alt 539 539 533 553 378 	2904 2950 2989 z(m) 2862 2830 2954	172 172 167 HDG 171 164 173	6.299 6.318 6.335 Dec.Lat 6.355 6.374 6.390	11.367 11.361 11.360 Plott Dec.Lor 11.350 11.350 11.337	5214 5186 5162 ted Posi (m) L-bck 4931 5109 5534	6 6 ition Lat Deg. 6 6	18.00 18.90 20.10 Min 21.35 22.50 23.70	11 11 11 Lon Deg 11 11	22.80 22.20 21.80 Min 21.47 21.00 20.65	Comments haul at 10 m/min stopped winch Chucking out at 15m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	062 062 062 CD16 SHIP JD 062 062 062 062 062 062 062 062 062	00:00 00:30 01:00 01:17 39 leg1: Time 01:26 01:27 01:30 01:51 02:00 02:28 02:30 03:00	06 2 06 2 06 2 scient Latitu deg n 06 2 06 2	20.78 11.86 12.85 ce log ude (S)I nin c 13.94 15.11	11 11 11 11 Long deg 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419	11.361 11.355 11.350 Dec.Lon 11.343 11.337	173 158 155 CMG 155 171	2.6 2.6 1.7 SMG 2.5 2.4	3361 3564 3546 Depth 3552 3521	27 27 27 Swath/ TOBI Line 27 27	#	5803 5802 5801 5801 TOBI W/0 5547 5538 5538 5538 5538 5675 6106 6106 6105	 397 355 431 Alt 539 539 533 553 378 	2904 2950 2989 z(m) 2862 2830	172 172 167 HDG 171 164	6.299 6.318 6.335 Dec.Lat 6.355 6.374	11.367 11.361 11.360 Plott Dec.Lor 11.350 11.350	5214 5186 5162 ted Posi (m) L-bck 4931 5109	6 6 ition Lat Deg. 6 6	18.00 18.90 20.10 Min 21.35 22.50	11 11 11 Lon Deg 11 11	22.80 22.20 21.80 Min 21.47 21.00	Comments haul at 10 m/min stopped winch Chucking out at 15m/min stopped winch
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	062 062 062 CD16 SHIP JD 062 062 062 062 062 062 062 062 062 062	00:00 00:30 01:00 01:17 9 leg1: 7 ime 01:26 01:27 01:30 01:51 02:00 02:28 02:30 03:00 03:18	06 2 06 2 scient Latitu deg n 06 2 06 2	20.78 11.86 12.85 ce log ude (S)I nin c 13.94 15.11	11 11 11 11 Long deg 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23 19.87	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419 6.440	11.361 11.355 11.350 Dec.Lon 11.343 11.337 11.331	173 158 155 CMG 155 171 168	2.6 2.6 1.7 SMG 2.5 2.4 2.7	3361 3564 3546 Depth 3552 3521 3525	27 27 27 Swath/ TOBI Line 27 27 27	#	5803 5802 5801 5801 TOBI W/0 5547 5538 5538 5538 5538 5538 5675 6106 6105 6105 6105	 397 355 431 Alt 539 539 533 553 378 	2904 2950 2989 z(m) 2862 2830 2954	172 172 167 HDG 171 164 173	6.299 6.318 6.335 Dec.Lat 6.355 6.374 6.390	11.367 11.361 11.360 Plott Dec.Lor 11.350 11.350 11.337	5214 5186 5162 ted Posi (m) L-bck 4931 5109 5534	6 6 ition Lat Deg. 6 6	18.00 18.90 20.10 Min 21.35 22.50 23.70	11 11 11 Lon Deg 11 11	22.80 22.20 21.80 Min 21.47 21.00 20.65	Comments haul at 10 m/min stopped winch Chucking out at 15m/min stopped winch veer 10 m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	062 062 062 CD16 SHIP JD 062 062 062 062 062 062 062 062 062 062	00:00 00:30 01:00 01:17 9 leg1: 7 ime 01:26 01:27 01:30 01:51 02:00 02:28 02:30 02:28 02:30 03:00 03:18 03:27	06 2 06 2 scient Latitu deg n 06 2 06 2 06 2 06 2	20.78 21.86 22.85 2009 2009 2009 23.94 25.11 26.37 27.48	11 11 11 11 Long deg 11 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23 19.87 19.47	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419 6.440 6.458	11.361 11.355 11.350 Dec.Lon 11.343 11.337 11.331 11.325	173 158 155 CMG 155 171 168 153	2.6 2.6 1.7 SMG 2.5 2.4 2.7 1.8	3361 3564 3546 Depth 3552 3521 3525 3504	27 27 27 Swath/ TOBI Line 27 27 27 28	#	5803 5802 5801 5801 TOBI W/0 5547 5538 5538 5538 5538 5538 5675 6106 6105 6105 6105 6105 6189	 397 3355 431 431 539 553 358 475 	2904 2950 2989 z(m) 2862 2830 2954 2923	172 172 167 HDG 171 164 173 167	6.299 6.318 6.335 Dec.Lat 6.355 6.374 6.390 6.409	11.367 11.361 11.360 Plott 11.350 11.350 11.337 11.336	5214 5186 5162 (m) L-bck 4931 5109 5534 5550	6 6 6 1 Lat Deg. 6 6 6	18.00 18.90 20.10 Min 21.35 22.50 23.70 24.70	11 11 11 11 Deg 11 11 11	22.80 22.20 21.80 Min 21.47 21.00 20.65 20.30	Comments haul at 10 m/min stopped winch Chucking out at 15m/min stopped winch
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	062 062 062 CD16 SHIP JD 062 062 062 062 062 062 062 062 062 062	00:00 00:30 01:00 01:17 9 leg1: Time 01:26 01:27 01:30 01:51 02:00 02:28 02:30 03:00 03:18 03:27 03:33	06 2 06 2 scient Latitu 06 2 06 2 06 2 06 2 06 2 06 2 06 2 06 2	20.78 11.86 12.85 12.85 12.85 12.85 12.85 12.85 12.85 12.85 13.94 15.11 16.37 17.48 18.79	11 11 11 11 Long deg 11 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23 19.87 19.47 19.00	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419 6.440 6.458 6.480	11.361 11.355 11.350 Dec.Lon 11.343 11.337 11.331 11.325 11.317	173 158 155 CMG 155 171 168 153 159	2.6 2.6 1.7 SMG 2.5 2.4 2.7 1.8 2.6	3361 3564 3546 Depth 3552 3521 3525 3504 3544	27 27 27 Swath/ TOBI Line 27 27 27 28 28	#	5803 5802 5801 5801 TOBI W/0 5547 5538 5538 5538 5538 5675 6106 6106 6105 6105 6105 6105 6189 6189	 397 355 431 Alt 539 553 378 475 493 	2904 2950 2989 z(m) 2862 2830 2954 2923 2959	172 172 167 HDG 171 164 173 167 169	6.299 6.318 6.335 Dec.Lat 6.355 6.374 6.390 6.409 6.430	11.367 11.361 11.360 Plott Dec.Lor 11.350 11.350 11.337 11.336 11.326	5214 5186 5162 (m) L-bck 4931 5109 5534 5550 5626	6 6 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	18.00 18.90 20.10 Min 21.35 22.50 23.70 24.70 26.00	11 11 11 11 Deg 11 11 11	22.80 22.20 21.80 Min 21.47 21.00 20.65 20.30 19.90	Comments haul at 10 m/min stopped winch Chucking out at 15m/min stopped winch veer 10 m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	062 062 062 CD16 SHIP JD 062 062 062 062 062 062 062 062 062 062	00:00 00:30 01:00 01:17 9 leg1: 7 ime 01:26 01:27 01:30 01:51 02:00 02:28 02:30 02:28 02:30 03:00 03:18 03:27	06 2 06 2 scient Latitu deg n 06 2 06 2 06 2 06 2	20.78 11.86 12.85 12.85 12.85 12.85 12.85 12.85 12.85 12.85 13.94 15.11 16.37 17.48 18.79	11 11 11 11 Long deg 11 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23 19.87 19.47	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419 6.440 6.458	11.361 11.355 11.350 Dec.Lon 11.343 11.337 11.331 11.325	173 158 155 CMG 155 171 168 153	2.6 2.6 1.7 SMG 2.5 2.4 2.7 1.8	3361 3564 3546 Depth 3552 3521 3525 3504	27 27 27 Swath/ TOBI Line 27 27 27 28	#	5803 5802 5801 5801 TOBI W/0 5547 5538 5538 5538 5538 5675 6106 6106 6105 6105 6105 6105 6189 6189	 397 355 431 Alt 539 553 378 475 493 	2904 2950 2989 z(m) 2862 2830 2954 2923 2959	172 172 167 HDG 171 164 173 167	6.299 6.318 6.335 Dec.Lat 6.355 6.374 6.390 6.409	11.367 11.361 11.360 Plott 11.350 11.350 11.337 11.336	5214 5186 5162 (m) L-bck 4931 5109 5534 5550	6 6 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	18.00 18.90 20.10 Min 21.35 22.50 23.70 24.70	11 11 11 11 Deg 11 11 11	22.80 22.20 21.80 Min 21.47 21.00 20.65 20.30	Comments haul at 10 m/min stopped winch Chucking out at 15m/min stopped winch veer 10 m/min
TOB-03 TOB-03	062 062 062 CD16 SHIP JD 062 062 062 062 062 062 062 062 062 062	00:00 00:30 01:00 01:17 9 leg1: Time 01:26 01:27 01:30 01:51 02:00 02:28 02:30 03:00 03:18 03:27 03:33	06 2 06 2 scient Latitu 06 2 06 2 06 2 06 2 06 2 06 2 06 2 06 2	20.78 11.86 12.85 12.85 12.85 12.85 12.85 12.85 12.85 12.85 13.94 15.11 16.37 17.48 18.79	11 11 11 11 Long deg 11 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23 19.87 19.47 19.00	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419 6.440 6.458 6.480	11.361 11.355 11.350 Dec.Lon 11.343 11.337 11.331 11.325 11.317	173 158 155 CMG 155 171 168 153 159	2.6 2.6 1.7 SMG 2.5 2.4 2.7 1.8 2.6	3361 3564 3546 Depth 3552 3521 3525 3504 3544	27 27 27 Swath/ TOBI Line 27 27 27 28 28	#	5803 5802 5801 5801 TOBI W/0 5547 5538 5538 5538 5538 5675 6106 6106 6105 6105 6105 6105 6189 6189	 397 355 431 Alt 539 553 378 475 493 	2904 2950 2989 z(m) 2862 2830 2954 2923 2959	172 172 167 HDG 171 164 173 167 169	6.299 6.318 6.335 Dec.Lat 6.355 6.374 6.390 6.409 6.430	11.367 11.361 11.360 Plott Dec.Lor 11.350 11.350 11.337 11.336 11.326	5214 5186 5162 (m) L-bck 4931 5109 5534 5550 5626	6 6 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	18.00 18.90 20.10 Min 21.35 22.50 23.70 24.70 26.00	11 11 11 11 Deg 11 11 11	22.80 22.20 21.80 Min 21.47 21.00 20.65 20.30 19.90	Comments haul at 10 m/min stopped winch Chucking out at 15m/min stopped winch veer 10 m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	062 062 062 062 062 062 062 062 062 062	00:00 00:30 01:00 01:17 9 leg1: Time 01:26 01:27 01:30 01:51 02:00 02:28 02:30 03:00 03:18 03:27 03:33 04:00	06 2 06 2 scient Latitu 06 2 06 2 06 2 06 2 06 2 06 2 06 2 06 2	20.78 11.86 12.85 12.85 12.85 12.85 12.85 12.85 12.85 12.85 13.94 15.11 16.37 17.48 18.79	11 11 11 11 Long deg 11 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23 19.87 19.47 19.00	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419 6.440 6.458 6.480	11.361 11.355 11.350 Dec.Lon 11.343 11.337 11.331 11.325 11.317	173 158 155 CMG 155 171 168 153 159	2.6 2.6 1.7 SMG 2.5 2.4 2.7 1.8 2.6	3361 3564 3546 Depth 3552 3521 3525 3504 3544	27 27 27 Swath/ TOBI Line 27 27 27 28 28	#	5803 5802 5801 5801 TOBI W/0 5547 5538 5538 5538 5538 5675 6106 6106 6105 6105 6105 6105 6189 6189 6198	 397 355 431 Alt 539 553 378 475 493 	2904 2950 2989 z(m) 2862 2830 2954 2923 2959	172 172 167 HDG 171 164 173 167 169	6.299 6.318 6.335 Dec.Lat 6.355 6.374 6.390 6.409 6.430	11.367 11.361 11.360 Plott Dec.Lor 11.350 11.350 11.337 11.336 11.326	5214 5186 5162 (m) L-bck 4931 5109 5534 5550 5626	6 6 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	18.00 18.90 20.10 Min 21.35 22.50 23.70 24.70 26.00	11 11 11 11 Deg 11 11 11	22.80 22.20 21.80 Min 21.47 21.00 20.65 20.30 19.90	Comments haul at 10 m/min stopped winch Chucking out at 15m/min stopped winch veer 10 m/min stopped winch
TOB-03 TOB-03	062 062 062 CD16 SHIP JD 062 062 062 062 062 062 062 062 062 062	00:00 00:30 01:00 01:17 39 leg1: Time 01:26 01:27 01:30 01:51 02:00 02:28 02:30 03:00 03:18 03:27 03:33 04:00 04:04	06 2 06 2 scient Latitu 06 2 06 2 06 2 06 2 06 2 06 2 06 2 06 2	10.78 11.86 12.85 ce log uade (S)I nin 3.94 5.11 16.37 17.48 18.79 19.80	11 11 11 11 11 11 11 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23 19.87 19.47 19.00	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419 6.440 6.458 6.480	11.361 11.355 11.350 Dec.Lon 11.343 11.337 11.331 11.325 11.317	173 158 155 CMG 155 171 168 153 159	2.6 2.6 1.7 SMG 2.5 2.4 2.7 1.8 2.6	3361 3564 3546 Depth 3552 3521 3525 3504 3544	27 27 27 Swath/ TOBI Line 27 27 27 28 28	#	5803 5802 5801 5801 TOBI W/0 55547 55538 55538 55538 55538 55538 55538 55538 55538 55538 55538 55538 55538 55538 55538 55538 55547 6106 6105 6105 6189 6189 6189 6189 6189 6189 6189 6189	397 355 355 431 539 533 653 378 4775 493 513 513	2904 2950 2989 2862 2862 2830 2954 2954 2959 2959	172 172 167 HDG 171 164 173 167 169	6.299 6.318 6.335 Dec.Lat 6.355 6.374 6.390 6.409 6.430	11.367 11.361 11.360 Plott Dec.Lor 11.350 11.350 11.337 11.336 11.326	5214 5186 5162 (m) L-bck 4931 5109 5534 5550 5626	6 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	18.00 18.90 20.10 Min 21.35 22.50 23.70 24.70 26.00	11 11 11 11 11 11 11 11 11	22.80 22.20 21.80 Min 21.47 21.00 20.65 20.30 19.90	Comments haul at 10 m/min stopped winch Chucking out at 15m/min stopped winch veer 10 m/min stopped winch veer 15m/min
TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03 TOB-03	062 062 062 CD16 SHIP 062 062 062 062 062 062 062 062 062 062	00:00 00:30 01:00 01:17 9 leg1: 7 Time 01:26 01:27 01:30 01:51 02:00 02:28 02:30 03:00 02:28 02:30 03:18 03:27 03:33 04:00 04:04 04:18	06 2 06 2 scien Latitu 06 2 06 2 06 2 06 2 06 2 06 2 06 2	10.78 11.86 12.85 ce log uade (S)I nin 3.94 5.11 16.37 17.48 18.79 19.80	11 11 11 11 11 11 11 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23 19.87 19.47 19.00 18.60	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419 6.440 6.458 6.480 6.497	11.361 11.355 11.350 Dec.Lon 11.343 11.337 11.337 11.331 11.325 11.317 11.310	173 158 155 CMG 155 171 168 153 159 162	2.6 2.6 1.7 SMG 2.5 2.4 2.7 1.8 2.6 2.1	3361 3564 3546 Depth 3552 3521 3525 3504 3544 3629	27 27 27 Swath/ TOBI Line 27 27 27 28 28 28 28	#	5803 5802 5801 5801 TOBI W/0 55547 55538 55538 55538 55538 55538 55538 55538 55538 55538 55538 55538 55538 55538 55538 55538 55547 6106 6105 6105 6189 6189 6189 6189 6189 6189 6189 6189	397 355 355 431 539 533 653 378 4775 493 513 513	2904 2950 2989 2862 2862 2830 2954 2954 2959 2959	172 172 167 HDG 171 164 173 167 169 162	6.299 6.318 6.335 Dec.Lat 6.355 6.374 6.390 6.409 6.430 6.448	11.367 11.361 11.360 Plott Dec.Lor 11.350 11.350 11.337 11.336 11.326 11.326	5214 5186 5162 (m) L-bck 4931 5109 5534 5550 5626 5637	6 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	18.00 18.90 20.10 Min 21.35 22.50 23.70 24.70 26.00 26.60	11 11 11 11 11 11 11 11 11	22.80 22.20 21.80 Min 21.47 21.00 20.65 20.30 19.90 20.20	Comments haul at 10 m/min stopped winch Chucking out at 15m/min stopped winch veer 10 m/min stopped winch veer 15m/min
TOB-03 TOB-03	062 062 062 062 062 062 062 062 062 062	00:00 01:00 01:17 99 leg1: Time 01:26 01:27 01:30 01:51 02:00 01:51 02:00 03:18 03:27 03:33 04:00 04:04 04:18 04:30	06 2 06 2 06 2 06 2 06 2 06 2 06 2 06 2	0.78 11.86 22.85 ce log dde (S) 33.94 55.11 55.11 66.37 7.7.48 88.79 99.80	11 11 11 11 Long deg 11 11 11 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23 19.87 19.47 19.00 18.60	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419 6.440 6.458 6.480 6.497	11.361 11.355 11.350 Dec.Lon 11.343 11.337 11.337 11.331 11.325 11.317 11.310	173 158 155 CMG 155 171 168 153 159 162	2.6 2.6 1.7 SMG 2.5 2.4 2.7 1.8 2.6 2.1	3361 3564 3546 Depth 3552 3521 3525 3504 3544 3629	27 27 27 Swath/ TOBI Line 27 27 27 28 28 28 28	#	 5803 5802 5801 5801 5801 5801 5501 5538 5538 5675 56106 6105 6105 6105 6105 6105 6106 6105 6106 6105 6106 6105 6106 6105 6106 6406 6406 6406 6406 	 397 355 431 539 539 653 378 475 493 513 407 	2904 2950 2989 2862 2862 2830 2954 2954 2959 2959	172 172 167 HDG 171 164 173 167 169 162	6.299 6.318 6.335 Dec.Lat 6.355 6.374 6.390 6.409 6.430 6.448	11.367 11.361 11.360 Plott Dec.Lor 11.350 11.350 11.337 11.336 11.326 11.326	5214 5186 5162 (m) L-bck 4931 5109 5534 5550 5626 5637	6 6 ition Lat Deg. 6 6 6 6 6 6 6 6	18.00 18.90 20.10 Min 21.35 22.50 23.70 24.70 26.00 26.60	111 11 11 Deg 11 11 11 11 11	22.80 22.20 21.80 Min 21.47 21.00 20.65 20.30 19.90 20.20	Comments haul at 10 m/min stopped winch Chucking out at 15m/min stopped winch veer 10 m/min stopped winch veer 15m/min winch stopped
TOB-03 TOB-03	062 062 062 CD16 SHIP 062 062 062 062 062 062 062 062 062 062	00:00 01:00 01:17 99 Jeg1: 700 01:27 01:26 01:27 01:30 01:27 01:30 01:27 01:30 02:28 02:30 03:31 03:33 03:33 03:33 03:33 03:33 03:33 03:33 03:33 03:33 03:33 03:33 03:33 03:33 03:33 03:33 04:00 04:02 00 0000000000	06 2 06 2 06 2 06 2 06 2 06 2 06 2 06 2	0.78 11.86 22.85 ce log dde (S) 33.94 55.11 55.11 66.37 7.7.48 88.79 99.80	11 11 11 11 Long deg 11 11 11 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23 19.87 19.47 19.00 18.60	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419 6.440 6.458 6.480 6.497 6.517	11.361 11.355 11.350 Dec.Lon 11.343 11.337 11.337 11.325 11.317 11.310 11.304	173 158 155 CMG 155 171 168 153 159 162 164	2.6 2.6 1.7 SMG 2.5 2.4 2.7 1.8 2.6 2.1 2.2	3361 3564 3546 3552 3552 3521 3525 3504 3544 3629 3747	27 27 27 Swath/ TOBI Line 27 27 27 28 28 28 28 28 28	#	 5803 5802 5801 5801 5801 5801 5501 5538 5538 5675 56106 6105 6105 6105 6105 6105 6106 6105 6106 6105 6106 6105 6106 6105 6106 6406 6406 6406 6406 	 397 355 431 539 539 653 378 475 493 513 407 	2904 2950 2989 2862 2830 2954 2923 2954 2925 2959 2958 3036	172 172 167 HDG 171 164 173 167 169 162 169	6.299 6.318 6.335 Dec.Lat 6.355 6.374 6.390 6.409 6.430 6.448 6.465	11.367 11.361 11.360 Plott Dec.Lor 11.350 11.350 11.337 11.336 11.326 11.326 11.314	5214 5186 5162 (m) L-bck 4931 5109 5534 5550 5626 5637 5831	6 6 ition Lat Deg. 6 6 6 6 6 6 6 6	18.00 18.90 20.10 Min 21.35 22.50 23.70 24.70 26.00 26.60 28.05	111 11 11 Deg 11 11 11 11 11	22.80 22.20 21.80 Min 21.47 21.47 21.00 20.65 20.30 19.90 20.20 19.20	Comments haul at 10 m/min stopped winch Chucking out at 15m/min stopped winch veer 10 m/min winch stopped veer 10m/min
TOB-03 TOB-03	062 062 062 062 062 062 062 062 062 062	00:00 01:00 01:17 9 leg1: 11:26 01:27 01:30 01:51 02:00 02:28 02:30 03:00 02:28 03:30 03:18 03:27 03:33 04:00 04:04 04:18 04:43 04:43 04:43 04:52 05:22	06 2 06 3 06 3 06 3 06 3	0.78 11.86 22.85 3.24 3.3.94 3.3.94 5.5.11 6.37 7.7.48 8.79 9.80 11.00 12.23	11 11 11 11 11 11 11 11 11 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23 19.87 19.47 19.00 18.60 18.22 17.84	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419 6.440 6.458 6.480 6.497 6.517 6.537	11.361 11.355 11.350 Dec.Lon 11.343 11.337 11.331 11.325 11.317 11.310 11.304 11.297	173 158 155 155 175 171 168 153 159 162 164 156	2.6 2.6 1.7 2.5 2.4 2.7 1.8 2.6 2.1 2.2 2.6	3361 3564 3546 3552 3521 3525 3504 3544 3629 3747 3773	27 27 27 Swath/ TOBI 27 27 27 28 28 28 28 28 28 28	#	5803 5802 5801 TOBI W/o 5547 5538 5538 5538 5538 5538 5538 5538 553	397 355 355 431 539 533 553 378 493 513 407 460	2904 2950 2989 2989 z(m) 2862 2830 2954 2923 2959 2959 3036 3066 3066	172 172 167 HDG 171 164 173 167 169 162 169	6.299 6.318 6.335 Dec.Lat 6.355 6.374 6.390 6.409 6.448 6.465 6.484	11.367 11.361 11.360 Plott Dec.Lor 11.350 11.350 11.350 11.326 11.326 11.326 11.326	5214 5186 5162 (m) L-bck 4931 5109 5534 5550 5626 5637 5831 5942	6 6 6 1 2 9 6 6 6 6 6 6 6 6 6 6 6 6 6	18.00 18.90 20.10 21.35 22.50 23.70 24.70 26.00 26.00 28.05 29.20	11 11 11 11 11 11 11 11 11 11	22.80 22.20 21.80 Min 21.47 21.00 20.65 20.30 19.90 20.20 19.20 18.75	Comments haul at 10 m/min stopped winch Chucking out at 15m/min stopped winch veer 10 m/min stopped winch veer 15m/min winch stopped veer 10m/min 5 mins TOBI swath lost, then back on its own again.
TOB-03 TOB-03	062 062 062 CD16 SHIP JD 062 062 062 062 062 062 062 062 062 062	00:00 01:00 01:17 9 leg1: 01:26 01:27 01:30 01:51 02:20 03:00 03:18 03:27 03:33 04:00 04:44 04:18 04:42 05:02 05:21	06 2 06 2 06 2 06 2 06 2 06 2 06 2 06 2	0.78 11.86 22.85 3.24 3.3.94 3.3.94 5.5.11 6.37 7.7.48 8.79 9.80 11.00 12.23	11 11 11 11 11 11 11 11 11 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23 19.87 19.47 19.00 18.60	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419 6.440 6.458 6.480 6.497 6.517	11.361 11.355 11.350 Dec.Lon 11.343 11.337 11.337 11.325 11.317 11.310 11.304	173 158 155 CMG 155 171 168 153 159 162 164	2.6 2.6 1.7 SMG 2.5 2.4 2.7 1.8 2.6 2.1 2.2	3361 3564 3546 3552 3552 3521 3525 3504 3544 3629 3747	27 27 27 Swath/ TOBI Line 27 27 27 28 28 28 28 28 28	#	5803 5802 5801 TOBI W/o 5547 5538 5538 5538 5538 5538 5538 5538 553	397 355 355 431 539 533 553 378 493 513 407 460	2904 2950 2989 2862 2830 2954 2923 2954 2925 2959 2958 3036	172 172 167 HDG 171 164 173 167 169 162 169	6.299 6.318 6.335 Dec.Lat 6.355 6.374 6.390 6.409 6.430 6.448 6.465	11.367 11.361 11.360 Plott Dec.Lor 11.350 11.350 11.337 11.336 11.326 11.326 11.314	5214 5186 5162 (m) L-bck 4931 5109 5534 5550 5626 5637 5831	6 6 6 1 2 9 6 6 6 6 6 6 6 6 6 6 6 6 6	18.00 18.90 20.10 Min 21.35 22.50 23.70 24.70 26.00 26.60 28.05	11 11 11 11 11 11 11 11 11 11	22.80 22.20 21.80 Min 21.47 21.47 21.00 20.65 20.30 19.90 20.20 19.20	Comments haul at 10 m/min stopped winch Chucking out at 15m/min stopped winch veer 10 m/min stopped winch veer 15m/min winch stopped veer 10m/min 5 mins TOBI swath lost, then back on its own again. winch stopped
TOB-03 TOB-03	062 062 062 062 062 062 062 062 062 062	00:00 01:00 01:00 01:17 9 leg1: 126 01:27 01:30 02:28 02:30 03:00 03:18 03:27 03:33 03:00 04:00 04:04 04:18 04:30 04:52 05:32 05:39	06 2 06 3 06 3 06 3 06 3	0.78 11.86 22.85 3.24 3.3.94 3.3.94 5.5.11 6.37 7.7.48 8.79 9.80 11.00 12.23	11 11 11 11 11 11 11 11 11 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23 19.87 19.47 19.00 18.60 18.22 17.84	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419 6.440 6.458 6.480 6.497 6.517 6.537	11.361 11.355 11.350 Dec.Lon 11.343 11.337 11.331 11.325 11.317 11.310 11.304 11.297	173 158 155 155 175 171 168 153 159 162 164 156	2.6 2.6 1.7 2.5 2.4 2.7 1.8 2.6 2.1 2.2 2.6	3361 3564 3546 3552 3521 3525 3504 3544 3629 3747 3773	27 27 27 Swath/ TOBI 27 27 27 28 28 28 28 28 28 28	#	5803 5802 5801 TOBI W/o 5547 5538 5538 5538 5538 5538 5538 5538 553	397 355 355 431 539 533 553 378 493 513 407 460	2904 2950 2989 2989 z(m) 2862 2830 2954 2923 2959 2959 3036 3066 3066	172 172 167 HDG 171 164 173 167 169 162 169	6.299 6.318 6.335 Dec.Lat 6.355 6.374 6.390 6.409 6.448 6.465 6.484	11.367 11.361 11.360 Plott Dec.Lor 11.350 11.350 11.350 11.326 11.326 11.326 11.326	5214 5186 5162 (m) L-bck 4931 5109 5534 5550 5626 5637 5831 5942	6 6 6 1 2 9 6 6 6 6 6 6 6 6 6 6 6 6 6	18.00 18.90 20.10 21.35 22.50 23.70 24.70 26.00 26.00 28.05 29.20	11 11 11 11 11 11 11 11 11 11	22.80 22.20 21.80 Min 21.47 21.00 20.65 20.30 19.90 20.20 19.20 18.75	Comments haul at 10 m/min stopped winch Chucking out at 15m/min stopped winch veer 10 m/min stopped winch veer 15m/min winch stopped veer 10m/min 5 mins TOBI swath lost, then back on its own again. winch stopped ship slowed to around 2.2
TOB-03 TOB-03	062 062 062 062 062 062 062 062 062 062	00:00 01:00 01:17 9 leg1: 126 01:27 01:30 01:27 01:30 01:21 01:20 02:28 02:30 03:00 02:28 02:30 03:00 02:28 03:30 03:18 03:27 03:33 04:00 04:04 04:42 04:42 04:42 05:02 05:54	06 2 06 2 scien. Latitu deg n 06 2 06 2 06 2 06 2 06 2 06 3 06 3 06 3	0.78 11.86 12.85 cc log 1de (S) 13.94 15.11 16.37 17.48 18.79 19.80 11.00 12.23 13.26	11 11 11 11 11 11 11 11 11 11 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23 19.87 19.47 19.47 19.00 18.60 18.22 17.84 17.45	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419 6.440 6.458 6.480 6.497 6.517 6.557 6.554	11.361 11.355 11.350 Dec.Lon 11.343 11.337 11.331 11.325 11.317 11.310 11.304 11.297 11.291	173 158 155 CMG 155 171 168 153 159 162 164 156 152	2.6 2.6 1.7 SMG 2.5 2.4 2.7 1.8 2.6 2.1 2.2 2.6 2.2	3361 3564 3554 3552 3521 3525 3504 3544 3629 3747 3773 3781	27 27 27 3 swath/ TOBI 27 27 27 28 28 28 28 28 28 28 28	#	5803 5802 5801 5801 5531 5538 5538 5538 5538 5538 5538 553	397	2904 2950 2989 2989 z(m) 2862 2830 2954 2959 2959 30366 32066	172 172 167 HDG 171 164 173 167 169 162 169 168 172	6.299 6.318 6.335 Dec.Lat 6.355 6.374 6.390 6.409 6.440 6.448 6.465 6.484 6.499	11.367 11.361 11.360 Plott Dec.Lor 11.350 11.350 11.337 11.336 11.326 11.326 11.328 11.314 11.308 11.299	5214 5186 5162 (m) L-bck 4931 5109 5534 5550 5626 5637 5831 5942 6171	6 6 1 2 2 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	18.00 18.90 20.10 21.35 22.50 23.70 24.70 26.00 28.05 29.20 30.30	11 11 11 11 11 11 11 11 11 11 11 11	22.80 22.20 21.80 Min 21.47 21.00 20.65 20.30 19.90 20.20 19.20 19.20 18.75 18.55	Comments haul at 10 m/min stopped winch Chucking out at 15m/min stopped winch veer 10 m/min stopped winch veer 15m/min winch stopped veer 10m/min 5 mins TOBI swath lost, then back on its own again. winch stopped
TOB-03 TOB-03	062 062 062 CD16 SHIP JD 062 062 062 062 062 062 062 062 062 062	00:00 01:00 01:00 01:17 9 leg1: 11:26 01:27 01:30 01:51 02:02 03:30 03:30 03:30 03:30 03:33 04:00 04:04 04:18 04:52 05:52 05:54 06:00	06 2 06 3 06 3 06 3 06 3	0.78 11.86 12.85 cc log 1de (S) 3.94 5.11 6.37 7.7.48 8.79 9.80 11.00 12.23 13.26	11 11 11 11 11 11 11 11 11 11 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23 19.87 19.47 19.00 18.60 18.22 17.84	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419 6.440 6.458 6.480 6.497 6.517 6.537	11.361 11.355 11.350 Dec.Lon 11.343 11.337 11.331 11.325 11.317 11.310 11.304 11.297	173 158 155 155 175 171 168 153 159 162 164 156	2.6 2.6 1.7 2.5 2.4 2.7 1.8 2.6 2.1 2.2 2.6	3361 3564 3546 3552 3521 3525 3504 3544 3629 3747 3773	27 27 27 3wath/ TOBI Line 27 27 27 28 28 28 28 28 28 28	#	5803 5802 5801 TOBI W/0 5538 5538 5538 5538 5538 5538 5538 553	397	2904 2950 2989 2989 z(m) 2862 2830 2954 2923 2959 2959 3036 3066 3066	172 172 167 HDG 171 164 173 167 169 162 169	6.299 6.318 6.335 Dec.Lat 6.355 6.374 6.390 6.409 6.448 6.465 6.484	11.367 11.361 11.360 Plott Dec.Lor 11.350 11.350 11.350 11.326 11.326 11.326 11.326	5214 5186 5162 (m) L-bck 4931 5109 5534 5550 5626 5637 5831 5942	6 6 1 2 2 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	18.00 18.90 20.10 21.35 22.50 23.70 24.70 26.00 26.00 28.05 29.20	11 11 11 11 11 11 11 11 11 11 11 11	22.80 22.20 21.80 Min 21.47 21.00 20.65 20.30 19.90 20.20 19.20 18.75	Comments haul at 10 m/min stopped winch Chucking out at 15m/min stopped winch veer 10 m/min stopped winch veer 15m/min winch stopped veer 10m/min 5 mins TOBI swath lost, then back on its own again. winch stopped ship slowed to around 2.2 veer 10m/min
TOB-03 TOB-03	062 062 062 062 062 062 062 062 062 062	00:00 01:00 01:00 01:17 9 leg1: 11:26 01:27 01:30 01:51 02:02 03:30 03:30 03:30 03:30 03:33 04:00 04:04 04:18 04:52 05:52 05:54 06:00	06 2 06 2 scien. Latitu deg n 06 2 06 2 06 2 06 2 06 2 06 3 06 3 06 3	0.78 11.86 12.85 cc log 1de (S) 3.94 5.11 6.37 7.7.48 8.79 9.80 11.00 12.23 13.26	11 11 11 11 11 11 11 11 11 11 11 11	21.64 21.29 20.98 gitude (min 20.60 20.23 19.87 19.47 19.47 19.00 18.60 18.22 17.84 17.45	6.346 6.364 6.381 W) Dec.Lat 6.399 6.419 6.440 6.458 6.480 6.497 6.517 6.557 6.554	11.361 11.355 11.350 Dec.Lon 11.343 11.337 11.331 11.325 11.317 11.310 11.304 11.297 11.291	173 158 155 CMG 155 171 168 153 159 162 164 156 152	2.6 2.6 1.7 SMG 2.5 2.4 2.7 1.8 2.6 2.1 2.2 2.6 2.2	3361 3564 3554 3552 3521 3525 3504 3544 3629 3747 3773 3781	27 27 27 3 swath/ TOBI 27 27 27 28 28 28 28 28 28 28 28	#	5803 5802 5801 5801 5531 5538 5538 5538 5538 5538 5538 553	397	2904 2950 2989 2989 z(m) 2862 2830 2954 2959 2959 30366 32066	172 172 167 HDG 171 164 173 167 169 162 169 168 172	6.299 6.318 6.335 Dec.Lat 6.355 6.374 6.390 6.409 6.440 6.448 6.465 6.484 6.499	11.367 11.361 11.360 Plott Dec.Lor 11.350 11.350 11.337 11.336 11.326 11.326 11.328 11.314 11.308 11.299	5214 5186 5162 (m) L-bck 4931 5109 5534 5550 5626 5637 5831 5942 6171	6 6 1 2 2 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	18.00 18.90 20.10 21.35 22.50 23.70 24.70 26.00 28.05 29.20 30.30	11 11 11 11 11 11 11 11 11 11 11 11	22.80 22.20 21.80 Min 21.47 21.00 20.65 20.30 19.90 20.20 19.20 19.20 18.75 18.55	Comments haul at 10 m/min stopped winch Chucking out at 15m/min stopped winch veer 10 m/min stopped winch veer 15m/min winch stopped veer 10m/min 5 mins TOBI swath lost, then back on its own again. winch stopped ship slowed to around 2.2

TOB-03 TOB-03 TOB-03	062 062 062	06:20 06:30 06:46		34.48	11	16.69	6.575	11.278	158	2.2	3776	28	69 ⁻ 672 65	22	344	3323	168	6.521	11.289	603	33	6 32	2.40	11	17.70	haul 10m/min winch stopped
TOB-03 TOB-03	062 062	06:50 06:52											65 65													haul 15m/min COMPLETE POWER FAILURE
TOB-03	062	06.52											60	99												Some power back, no winch, incr. speed to 2.9kts
TOB-03	062	07:15	06	37.00	11	16.75	6.617	11.279																		TOBI back, got position from bridge
TOB-03 TOB-03	062 062	07:17 07:21																								a/c back to wp 28 21 minutes of data lost
TOB-03	062	07:30	06	37.19	11	16.68	6.620	11.278	171	2.6			654	15	593	3166	174	6.566	11.284	591	18	6				limited power,no winch
TOB-03 TOB-03	062	07:33	00	20.25		10 51	6.639	11.075	100	10			64	22	589	3136	179	6 596	11.276	586	64	6 35	5 20	44	16.95	winch power back
TOB-03	062 062	07:45 07:55		38.35		16.51	0.039	11.275	168	1.8			64		209	3130	179	6.586	11.270	500	04	0 3:	5.20		10.95	winch figure changed when got data from winch log. veer 15m/min
TOB-03	062	08:00		38.84	11	16.35	6.647	11.273	177	1.5			65		556	3137	182	6.593	11.270	594	41	6 35	5.90	11	16.85	
TOB-03 TOB-03	062 062	08:28 08:30		39.91	11	16.02	6.665	11.267	160	1.1	3771	28	69 69		381	3400	179	6.608	11.268	626	64	6 36	6 50	11	17.00	Winch stopped
TOB-03	062	08:50	00	55.51		10.02	0.005	11.207	100	1.1	5//1	20	03		501	5400	173	0.000	11.200	020	-	0.50	0.50		17.00	Ships power lost
TOB-03	063	08:53																								Ships power back
TOB-03 TOB-03	062 062	08:58 09:00											69	\$1												power back to winches haul 30 m/min
TOB-03	062	09:02	06	41.08	11	15.94	6.685	11.266	154	2.8		28	679		274		175	######	#######							
TOB-03	062	09:07											67	6												decrease haul 10 m/m
TOB-03 TOB-03	062 062	09:10 09:16		41.62	11	15.81	6.694	11.264	160	1.0	3698	28	66	39	561	3279	173	6.639	11.270	602	20	6 38	8.40	11	16.60	winch stopped
TOB-03	062	09:30		42.14	11		6.702	11.260	157	1.7	0000	28	66		521	3287	175	6.648	11.265	601	-	6 39			16.10	no water depth - haul 15 m/m
TOB-03	062	10:00		43.22		15.28	6.720	11.255	169	2.3	3230	28	62		567	3078	174	6.669	11.260	563		6 40			16.00	
TOB-03 TOB-03	062 062	10:30 10:32		44.31	11	14.96	6.739	11.249	138	3.1	3043	28	579 570		771	2893	171	6.692	11.257	521	10	6 41	1.50	11	15.50	Increase haul to 25m/m - RecoveringTOBI
TOB-03	062	10:35											0/1	,0												Increase haul to 40m/m
TOB-03	062	10:45		44.89		14.77	6.748	11.246	139	2.8	3040	28	52		616	2645	171	6.705	11.253	476	-					
TOB-03 TOB-03	062 062	11:00 11:30		45.44 46.48		14.61 14.34	6.757 6.775	11.244 11.239	138 196	3.0 3.1	3102 3260	28	464 342		868 998	2359 1849	173 173	6.719 6.747	11.248 11.242	423 306						
TOB-03	062	12:00		47.55		14.07	6.793	11.235	163	2.4	0200		230			1010		0								
TOB-03	062	12:30		48.63	11	13.84	6.811	11.231	168	2.0	3764		118	86												
TOB-03	062 CD16	13:00 9 leg1:		l ence log	1	I	1	I			I	Swath/	I	I					l Plot	l ted P	ositic	on	I			TOBI surfaced
	SHIP			itude (S		gitude	(W)					тові	то	ы							n) La			Lon		Comments
Operation	JD	Time	deg	min	deg	min	Dec.Lat	Dec.Lon	CMG	SMG	Depth	Line	# W/	0	Alt	z(m)	HDG	Dec.La	tDec.Lo	1 L-b	ck Je	g. M	lin	Deg	Min	
TOB-03 TOB-03	062 062	13:01 13:06																								6th MAPR on board (M9) - long fishing line around it End of fishing line
TOB-03	062	13:16																								5th MAPR on board (M8) -clear of line
TOB-03	062	13:20																								Depressor weight on board
TOB-03 TOB-03	062 062	13:40 13:52																								TOBI on board 3.5Hz fish on board
TOB-03	062	13:53																								4th MAPR on board (M29)
TOB-03	062	13:55																								10Hz fish on board
TOB-03 TOB-03	062 062	13:56 14:00																								3rd MAPR on board (M6) 2nd MAPR on board (M13)
TOB-03	062	14:05																								1st MAPR on board (M12) and batfish
Transit	062	14:07	06	50.22	11	14.04	6.837	11.234	243	5.7	4013								1							In transit
Transit	062	14:31	06	51.49		17.87	6.858	11.298	252	10.9																On course for Ascension
Transit	063	08:38		51.06		21.74	7.851	14.362	244	11.0																Approaching Ascension
Transit	063	09:15	07	54.00	14	25.02	7.900	14.417	104	4.4																Arrived, Ascension, for boat transfer.
										0	E	ND OF	CD169 L	EG	1											

	CD16	69 L ea2	: scienc	e loa								1			
	001		Lat. (So		Long.	(West)				BRIDGET	etc				
Operation	Jday		Deg	Min	Deg	Min	CMG	SMG	Wat. dept			Layback	Altitude	Comments	
			×												
	063	17:00												Under way from Ascension	
Transit	063	17:00	7	54.59	14	25.28	272	5.4						On way to CTD 03	
Transit	063	17:30	7	53.39	14	25.82	035	8.3						On way to CTD 03	
	064	05:30	6	18.13	13	22.45	031	10.2						transit to CTD station	
	064	06:00	6	13.26	13	19.37	035	10.5							
	064	07:00	6	6.40	13	14.93	195	1.0						10kHz fish in water, on station	
CTD03	064	07:15												Waiting for CTD winch	
	064	07:21												plug in sensors	
CTD03		07:23	6	6.33	13	14.93			3447					CTD in water	
CTD03		08:28	6	6.27	13	14.78	131	1.0	3440					CTD on bottom	
CTD03		08:32												Error = no bottle fire confirmation	
	064	08:40								3390	3400			attempt manual fire (Bottles 1 & 2)	
CTD03	064	08:55								3000	3017			attempt manual fire (Bottles 3 & 4)	
	064	09:05								2500	2513			attempt manual fire (Bottles 5 & 6)	
	064	09:17								2000	2004			attempt manual fire (Bottles 7 & 8)	
CTD03	064	09:38								1000	1003			attempt manual fire (Bottles 9 & 10)	
	064	09:58	6	6.75	10	14.04				10	15			attempt manual fire (Bottles 11 & 12)	
	064 064	10:02	6	6.75	13	14.31								CTD on deck, no bottles fired	
CTD03	064	10:04												Fe & Mn sensors unplugged	
Test 2	064	13:18	5	41.90	13	0.00	103	3390.0							
Test 2	064	13:10	э	41.90	13	0.00	103	3390.0						Re-positioning to avoid fishing buoy	
Test 2	064	13:35	5	42.06	12	59.98	153	3392.0						On station - CTD04	
Test 2	064	13:35	Э	42.00	12	59.90	155	3392.0						CTD in water	
		13:40												start pay-out to 500m for test firing 50m/m	
Test 2	064	13:50												All stop 500m	
Test 2	064	13:51	5	42.07	13	0.01								firing all bottles successfully	
	064	13:52	5	42.07	15	0.01								bringing CTD up to surface	
Test 2	064	14:05												CTD on deck - all fired	
1631 2	004	14.03												CTD on deck - air fired	
CTD04	064	14:30	5	42.48	12	59.56	145	1.0	3401	0	0	190		CTD in water	
CTD04	064	15:31	5	42.52	12	59.56	140	1.3	3481	3340	ů			CTD on bottom	
CTD04	064	15:32	Ū	12.02		00.00	110		3481	3340	3360			Fire bottles 1 & 2	
CTD04	064	15:40								3180	3200			Fire bottles 3 & 4	
CTD04	064	15:49								2981	3000			Fire bottles 5 & 6	
CTD04	064	15:58								2782	2800			Fire bottles 7 & 8	
CTD04	064	16:07							3399	2584	2600			Fire bottles 9 & 10	
CTD04	064	16:17								2389	2400			Fire bottles 11 & 12	
CTD04	064	16:25						1		2192	2200			Fire bottles 13 & 14	
CTD04	064	16:34				l				1990	1999				
	064	16:47								1492	1502			Fire bottles 17 & 18	
CTD04	064	17:00								990	1000			Fire bottles 19 & 20	
CTD04	064	17:14								491	500			Fire bottles 21 & 22	
CTD04	064	17:26								3	10			Fire bottles 23 & 24	
CTD04	064	17:29	5	42.57	12	59.31	177	0.5	3397					CTD on deck	
transit	064	18:23	5	37.50	12	56.10	052	10.0	3425					In transit to seg 2 RC05	
transit	064	19:03	5	34.50	12	52.10	056	10.8	3430					In transit to seg 2 RC05	
transit	064	19:30	5	31.90	12	48.50	057	10.7	3268					In transit to seg 2 RC05	
transit	064	20:00	5	29.20	12	44.80	057	11.0	3283					In transit to seg 2 RC05	
transit	064	20:30	5	26.11	12	40.84	053	10.9	3126					In transit to seg 2 RC05	
transit	064	21:00	5	22.79	12	33.43	050	10.9	3156					In transit to seg 2 RC05	
transit	064	21:31	5	19.34	12	33.60	052	10.7	2748					In transit to seg 2 RC05	
	CD16		: scienc		-		_			-					
			Lat. (So		Long. (BRIDGET					
Operation			Deg	Min	Deg	Min	CMG	SMG		Wire Out	Depth	Layback	Altitude	Comments	
transit	064	22:02	5	16.00	12	29.81	052	10.8	3109					In transit to seg 2 RC05	
transit	064	22:32	5	12.83	12	26.19	055	10.7	2678					In transit to seg 2 RC05	
transit	064	23:03	5	9.58	12	22.45	057	10.9	3646					In transit to seg 2 RC05	
RC05	064	23:30	5	7.04	12	19.36	070	6.3	3365					Slowing down for RC05	
RC05	064	23:45	5	6.88	12	19.18	137	1.2	3371					on station rc05	
RC05 RC05		23:55								0	3411			chipper in water	
	004	23:59								26	3362			MAPR in water	

ROS DOI:10 6 ROS ADD STATE STATE <th>RC05</th> <th>065</th> <th>00:10</th> <th>5</th> <th>6.88</th> <th>12</th> <th>19.19</th> <th></th> <th></th> <th>3381</th> <th>700</th> <th>3381</th> <th></th> <th></th> <th>75m/min</th> <th></th>	RC05	065	00:10	5	6.88	12	19.19			3381	700	3381			75m/min	
Res 665 0.03 6 0.2 1/2																
RC65 RC56 RC56 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>																
Rec6 665 0.42 6 6.91 12 19.17 3300 3464 3300 946 Hit reside of Pa - 3.1 RC65 665 0.71 6 6.22 19.27 13.000 3464 34000 3400																
Rec6s 685 695 6 692 12 13 3400 3461 9400 853 off bootsman image in the second secon																
RC06 665 6.5 6.8 12 19.7 1 3338 2986 190 70mmin Participation RC05 661 6 6.8 12 12.8 3332 12.8 13.8 1 13.8 1 13.8 1 13.8 1 13.8 1 13.8 1 13.8 1 13.8 1 13.8 1 13.8 1 13.8 1 13.8 1 13.8 1 13.8 13.8 1 13.8 1 13.8 1 13.8	RC05	065	00:42	5	6.91	12	19.17			3380	3464	3380	948		HIT- tension .47 to .31	
Rec6 665 91:10 5 6.80 12 12.22 1 3425 1960 3425 </td <td>RC05</td> <td>065</td> <td>00:47</td> <td>5</td> <td>6.92</td> <td>12</td> <td>19.17</td> <td></td> <td></td> <td>3400</td> <td>3464</td> <td>3400</td> <td>853</td> <td></td> <td>off bottom</td> <td></td>	RC05	065	00:47	5	6.92	12	19.17			3400	3464	3400	853		off bottom	
Rec6 665 91:10 5 6.80 12 12.22 1 3425 1960 3425 </td <td>RC05</td> <td>065</td> <td>00:55</td> <td>5</td> <td>6.93</td> <td>12</td> <td>19.17</td> <td></td> <td></td> <td>3336</td> <td>2966</td> <td>2966</td> <td>190</td> <td></td> <td>75m/min</td> <td></td>	RC05	065	00:55	5	6.93	12	19.17			3336	2966	2966	190		75m/min	
RC05 665 67.23 5 6.73 1 20.20 State																
RC65 660 0133 5 6.79 12 19.30 Alage 65 3342 Alage																
RC65 667 678 72 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>																
RC66 085 0.39 5 6.79 12 19.35 Image: Control of the second seco																
Iterail 688 COS 5 6.54 12 18.24 Image: Second Sec										3415	20	3415				
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transl 085 02:30 6 12 12 15:12 12 15:12 12 15:12 12 12:12 13:12 14:12 13:12	transit	065	02:15	5	6.14	12	16.81			3683	0	3683			in transit to seg 2 RC06	
transl 085 02:30 6 12 12 15:12 12 15:12 12 15:12 12 12:12 13:12 14:12 13:12	transit	065	02:20	5	6.00	12	16.35			3754	0	3754			Simrad line 55 started-\mbeam went off	
trans 085 02:28 6 6.27 12 17:21 39:99 39:99 and tools charmal products charmal products <td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td>											-					
transit 065 02:46 5 5.57 12 17.74 Image State Image Response Response Image Response Image Response																
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RC06 065 0.337 5 3.99 12 17.23 Image: Construction of the second of th																
RC60 065 0.349 5 3.98 12 77.93 3.820 3.825 MAPR MAPR Mater Duc path A RC60 065 04.00 12 17.23 3.825 3.846 MAPR MAPR Mater Duc path A <td>transit</td> <td>065</td> <td>03:25</td> <td>5</td> <td>3.99</td> <td>12</td> <td>17.37</td> <td></td> <td></td> <td>3642</td> <td></td> <td>3642</td> <td></td> <td></td> <td>in transit to seg 2 RC06 (arriving)</td> <td></td>	transit	065	03:25	5	3.99	12	17.37			3642		3642			in transit to seg 2 RC06 (arriving)	
RC00 061 0243 5 4.00 12 17.23 Image: Second Secon	RC06	065	03:37	5	3.99	12	17.29			3629		3629			RC06 on station	
RC00 061 0243 5 4.00 12 17.23 Image: Second Secon	RC06	065	03:40	5	3.98	12	17.29			3629		3629			Chipper in water	
RC06 065 04:00 5 4.00 12 17.28 3646 3662 60mmin RC06 065 04:49 5 4.00 12 17.28 3690 3602 60mmin RC06 065 04:49 5 4.00 12 17.28 3699 3753 3599 2734 MAPR off MAPR off RC06 065 04:49 5 4.07 12 12.23 3614 20 MAPR off MAPR off RC06 055 0:41 12 2738 231 11.1 28399 2733 3599 2734 11.3 11.3 212 11.3 212 213 11.1 2339 213 11.1 2312 11.1 2312 11.1 2312 11.1 2312 11.1 2324 11.1 2324 11.1 2324 11.1 2324 12 233 11.1 2324 11.1 2382 29 12 12 233																
RC60 065 0442 5 4.02 12 17.29 3600 3602 200 600mmin memory memory RC60 065 0442 5 4.03 12 17.29 3599 1753 3599 1254 2nd hit 2nd h									l							+
RC06 065 04:42 5 4.03 12 17.29 5 3599 1254 Hit rof6 up to 3700m then back down for 2nd hit mask RC06 065 04:48 5 4.03 12 17.29 3599 2753 3599 22nd hit MAPR off MAPR off RC06 065 05:51 - - - LUNE Transit to WP 29, line 29 - - - - LUNE Transit to WP 29, line 29 - - - - - - LUNE Transit to WP 29, line 29 -																
RC66 065 04.48 5 4.03 12 17.29 23 3599 27.63 3599 27.64 MAPR off RC66 065 05.57 - - - 9814 20 RC66 065 05.57 - - - LNE Transit 0VP 29, line 29 - RC66 060 060 -								l			0750		4051			
RC60 065 06.47 5 4.07 12 12.12.33 No.9 MAPR off RC60 065 05.57 Image: Constraint off													1254			
RC60 065 05.57 0 0 RC00 0.64 0.57 Transit 065 06.30 5 4.16 12 17.83 065 0.57 7 Transit 0.57 7 1.11 312 1.11 312 1.11 312 1 312 1.11 312 1.11 312 1 312 1.11 312 1 312 1.11 312 1 312 1.11 312 1 312 1.11 312 1 312 1.11 312 1 312 1.11 278 29 0.5 1.5 1.5 1.5 1.5 1.6 27.7 351 1.1 278 29 0.5 1.5												3599				
Transit 065 06-77 V V LINE Transit OF Transit OF Transit OF Transit OF OF Transit OF OF <thof< th=""> <thof< th=""> OF</thof<></thof<>	RC06	065	05:47	5	4.07	12	12.23			3614	20				MAPR off	
Transit 065 06-77 V V LINE Transit OF Transit OF Transit OF Transit OF OF Transit OF OF <thof< th=""> <thof< th=""> OF</thof<></thof<>	RC06	065	05:51												RC06 on deck	
Transit 065 062 5 4.16 12 17.83 36.4 Transit 065 07.00 1 24.18 20.35 323 11.1 3312 Inc. Transit 065 07.00 4 66.07 12 24.18 321 11.0 274 Inc. 2848 Inc. 36.2 at WP 29 sol 29 Inc. 36.2 at WP 29 Inc. 36.2 at WP 29 sol 29 Inc. 36.2 at WP 29 Inc. 37.2 at WP 30 37.2 at WP 30 </td <td></td> <td>LINE</td> <td></td> <td></td> <td></td> <td></td> <td></td>											LINE					
Transil 005 063.0 5 4.41 12 20.3 323 1.1 3312 Image: Constraint of the				5	4.16	12	17.83	334	0.1	3634						
Transi 065 07:00 4 56:07 12 24:18 22:19 26:07 10.0 2794 29 20:07																
Transit 065 07:13 4 54.05 12 25.09 a/c 11.0 2798 29 a/c a/c <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>																
Swath 065 07:17 4 53.3 12 26.5 352 11.1 2788 29 oc line 29 Swath 065 07:30 4 45.126 12 27.03 351 11.1 2820 29 oc line 29 transit 065 08:30 4 43.93 12 28.26 11.0 28.20 29 A/C at WP 30 - transit to trans stn (in a stn) transit 065 08:30 4 45.65 12 27.81 30.12 (in a stn) (in a st																
Swath 065 07.30 4 51.26 12 26.70 350 11.0 2620 29 Processing	Transit	065		4					11.0						a/c at WP 29 sol 29	
Swath Op5 Op5 </td <td>Swath</td> <td>065</td> <td>07:17</td> <td>4</td> <td>53.53</td> <td>12</td> <td>26.15</td> <td>352</td> <td>11.1</td> <td>2798</td> <td>29</td> <td></td> <td></td> <td></td> <td>o/c line 29</td> <td></td>	Swath	065	07:17	4	53.53	12	26.15	352	11.1	2798	29				o/c line 29	
Swath Op5 Obs 4 46.40 12 27.90 351 11.1 2681 29 Action	Swath	065	07:30	4	51 26	12	26 70	050	44.0							
transit 065 08:15 4 4393 12 28.26 110 8.4 3054 AC AC at W/P 30 - transit to trans stn Image: constraint of trans stn Image							20.70	350	11.0	2620	29					
fransit 065 08:30 4 45.65 12 27.18 132 9.5 3012 mail m				4												
TX01 065 08:51 4 1.96 12 25:55 134 1.6 2773 Image: Control of the co	Swath	065	08:00		46.40	12	27.90	351	11.1	2681					A/C at W/P 30 , transit to trans sto	
Tx01 065 09:15 4 47.13 12 25.52 12.8 1.4 27.80 slow transit to transponder deployment model TX01 065 09:30 4 47.54 12 25.08 132 5.7 2807 who knows!!! transponder D in water model <	Swath transit	065 065	08:00 08:15	4	46.40 43.93	12 12	27.90 28.26	351 110	11.1 8.4	2681 3054					A/C at W/P 30 - transit to trans stn	
TX01 065 09:30 4 47.54 12 25.08 132 5.7 2807 Image: Constraint of the second c	Swath transit transit	065 065 065	08:00 08:15 08:30	4	46.40 43.93 45.65	12 12 12	27.90 28.26 27.18	351 110 132	11.1 8.4 9.5	2681 3054 3012						
TX01 065 09:38	Swath transit transit TX01	065 065 065 065	08:00 08:15 08:30 08:51	4 4 4	46.40 43.93 45.65 1.96	12 12 12 12	27.90 28.26 27.18 25.55	351 110 132 134	11.1 8.4 9.5 1.6	2681 3054 3012 2773					slow to deploy USBL	
TX01 065 10:00 4 47.91 12 24.72 130 2.2 2859 weight in water - eventually!!!! image: constraint of the second of t	Swath transit transit TX01 TX01	065 065 065 065	08:00 08:15 08:30 08:51 09:15	4 4 4 4	46.40 43.93 45.65 1.96 47.13	12 12 12 12 12 12	27.90 28.26 27.18 25.55 25.52	351 110 132 134 128	11.1 8.4 9.5 1.6 1.4	2681 3054 3012 2773 2780					slow to deploy USBL slow transit to transponder deployment	
TX01 065 10:04 4 47.96 12 24.69 131 2.4 2874 Transponder D on bottom TX01 065 10:51 4 47.29 12 24.16 134 1.6 2937 Transponder D on bottom Image: Constraint of the constrain	Swath transit transit TX01 TX01	065 065 065 065 065	08:00 08:15 08:30 08:51 09:15	4 4 4 4	46.40 43.93 45.65 1.96 47.13	12 12 12 12 12 12	27.90 28.26 27.18 25.55 25.52	351 110 132 134 128	11.1 8.4 9.5 1.6 1.4	2681 3054 3012 2773 2780					slow to deploy USBL slow transit to transponder deployment	
TX01 065 10:04 4 47.96 12 24.69 131 2.4 2874 Transponder D on bottom TX01 065 10:51 4 47.29 12 24.16 134 1.6 2937 Transponder D on bottom Image: Constraint of the constrain	Swath transit transit TX01 TX01 TX01	065 065 065 065 065	08:00 08:15 08:30 08:51 09:15 09:30	4 4 4 4	46.40 43.93 45.65 1.96 47.13	12 12 12 12 12 12	27.90 28.26 27.18 25.55 25.52	351 110 132 134 128	11.1 8.4 9.5 1.6 1.4	2681 3054 3012 2773 2780					slow to deploy USBL slow transit to transponder deployment who knows!!!	
TX01 065 10:51 4 47.29 12 24.16 134 1.6 2937 Transponder D on bottom TX01 065 11:00 4 47.42 12 24.09 135 2.8 2909 11 TX01 065 11:30 4 48.48 12 24.16 183 2.3 2959 11 CD169 Leg2: science log Lat. (South) Long. (West) BRIDGET etc Comments 11 Operation Jay Deg Min CMG SMG MX dept Wire Out Depth Layback Attitude Comments TX01 065 11:30 4 48.42 12 25.30 312 2.1 2624 end of transponder test survey 1 transit 065 12:00 4 48.42 12 23.01 296 5 3209 CTD of transponder test survey 1 transit 065 13:09 4 48.42 12 23.01 296 0.5	Swath transit TX01 TX01 TX01 TX01 TX01	065 065 065 065 065 065	08:00 08:15 08:30 08:51 09:15 09:30 09:38	4 4 4 4 4	46.40 43.93 45.65 1.96 47.13 47.54	12 12 12 12 12 12 12	27.90 28.26 27.18 25.55 25.52 25.08	351 110 132 134 128 132	11.1 8.4 9.5 1.6 1.4 5.7	2681 3054 3012 2773 2780 2807					slow to deploy USBL slow transit to transponder deployment who knows!!!	
TX01 065 11:00 4 47.42 12 24.09 135 2.8 2909 1 TX01 065 11:30 4 48.48 12 24.16 183 2.3 2959 1 CD169 Legz: science log Long. (West) BRIDGET etc 1 <th1< th=""> <th1< th=""> <th1< th=""></th1<></th1<></th1<>	Swath transit TX01 TX01 TX01 TX01 TX01 TX01	065 065 065 065 065 065 065	08:00 08:15 08:30 08:51 09:15 09:30 09:38 10:00	4 4 4 4 4 4	46.40 43.93 45.65 1.96 47.13 47.54 47.91	12 12 12 12 12 12 12 12 12	27.90 28.26 27.18 25.55 25.52 25.08 24.72	351 110 132 134 128 132 132 130	11.1 8.4 9.5 1.6 1.4 5.7 2.2	2681 3054 3012 2773 2780 2807 2859					slow to deploy USBL slow transit to transponder deployment who knows!!! transponder D in water	
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CTD05 065 13:33 C CTD CTD </td <td>Swath transit TX01 TX01 TX01 TX01 TX01 TX01 TX01 TX01</td> <td>065 065 065 065 065 065 065 065 065 065</td> <td>08:00 08:15 08:30 09:15 09:30 09:38 10:00 10:04 10:51 11:00 11:30 69 Leg Time 11:55 12:00 13:09 13:12 13:19</td> <td>4 4 4 4 4 4 4 4 2: scienc Lat. (So Deg 4 4 4 4</td> <td>46.40 43.93 45.65 1.96 47.13 47.54 47.91 47.96 47.29 47.42 48.48 2e log buth) Min 48.55 48.42</td> <td>12 12 12 12 12 12 12 12 12 12 12 12 12 1</td> <td>27.90 28.26 27.18 25.55 25.52 25.08 24.72 24.69 24.16 24.09 24.16 West) Min 25.30 1.07</td> <td>351 110 132 134 128 132 130 131 134 135 183 CMG 312 045</td> <td>111.1 8.4 9.5 1.6 1.4 5.7 2.2 2.4 1.6 2.8 2.3 SMG 2.1 2.1 2.1</td> <td>2681 3054 3012 2773 2780 2807 2859 2874 2909 2959 2959 2959 2959 2959 2959</td> <td>29</td> <td></td> <td>Layback</td> <td>Altitude</td> <td>slow to deploy USBL slow transit to transponder deployment who knows!!! transponder D in water weight in water - eventually!!!! Transponder D on bottom Comments end of transponder test survey transit to CTD05 (at 5knts) sensor plugged in CTD in water stopped @ 50m CTD software problems</td> <td></td>	Swath transit TX01 TX01 TX01 TX01 TX01 TX01 TX01 TX01	065 065 065 065 065 065 065 065 065 065	08:00 08:15 08:30 09:15 09:30 09:38 10:00 10:04 10:51 11:00 11:30 69 Leg Time 11:55 12:00 13:09 13:12 13:19	4 4 4 4 4 4 4 4 2: scienc Lat. (So Deg 4 4 4 4	46.40 43.93 45.65 1.96 47.13 47.54 47.91 47.96 47.29 47.42 48.48 2e log buth) Min 48.55 48.42	12 12 12 12 12 12 12 12 12 12 12 12 12 1	27.90 28.26 27.18 25.55 25.52 25.08 24.72 24.69 24.16 24.09 24.16 West) Min 25.30 1.07	351 110 132 134 128 132 130 131 134 135 183 CMG 312 045	111.1 8.4 9.5 1.6 1.4 5.7 2.2 2.4 1.6 2.8 2.3 SMG 2.1 2.1 2.1	2681 3054 3012 2773 2780 2807 2859 2874 2909 2959 2959 2959 2959 2959 2959	29		Layback	Altitude	slow to deploy USBL slow transit to transponder deployment who knows!!! transponder D in water weight in water - eventually!!!! Transponder D on bottom Comments end of transponder test survey transit to CTD05 (at 5knts) sensor plugged in CTD in water stopped @ 50m CTD software problems	
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CTD05 065 13:56 CTD going down, no plots but digital data, background nephels are 90.379-90. CTD05 065 14:04 CTD going down, no plots but digital data, background nephels are 90.379-90. CTD05 065 14:15 4 45.95 12 23.11 CTD05 065 14:30 4 45.94 12 23.20 119 1.1 3165 Drifting to station Cross fills to station Drifting to station Cross fills to station Cr	Swath transit TX01 TX01 TX01 TX01 TX01 TX01 TX01 TX01	065 065 065 065 065 065 065 065 065 065	08:00 08:15 09:30 09:15 09:30 09:38 10:00 99:38 10:00 10:04 10:51 11:00 59 Legi 11:55 12:00 13:12 13:19 13:27 13:33	4 4 4 4 4 4 4 4 2: scienc Lat. (So Deg 4 4 4 4	46.40 43.93 45.65 1.96 47.13 47.54 47.91 47.96 47.29 47.42 48.48 2e log buth) Min 48.55 48.42	12 12 12 12 12 12 12 12 12 12 12 12 12 1	27.90 28.26 27.18 25.55 25.52 25.08 24.72 24.69 24.16 24.09 24.16 West) Min 25.30 1.07	351 110 132 134 128 132 130 131 134 135 183 CMG 312 045	111.1 8.4 9.5 1.6 1.4 5.7 2.2 2.4 1.6 2.8 2.3 SMG 2.1 2.1 2.1	2681 3054 3012 2773 2780 2807 2859 2874 2909 2959 2959 2959 2959 2959 2959	29		Layback	Altitude	slow to deploy USBL slow transit to transponder deployment who knows!!! transponder D in water weight in water - eventually!!!! Transponder D on bottom Comments end of transponder test survey transit to CTD05 (at 5knts) sensor plugged in CTD in water stopped @ 50m CTD software problems CTD coming up CTD suspended to restart and reset software CTD back in water, to 5m	
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CTD05 065 14:30 4 45.94 12 23.20 119 1.1 3165 Drifting to station CTD05 065 14:45 4 45.36 12 23.41 124 1.0 3127 Drifting to correct position	Swath transit transit TX01 TX01 TX01 TX01 TX01 TX01 TX01 TX01	065 065 065 065 065 065 065 065 065 065	08:00 08:15 09:30 09:31 09:30 09:38 10:00 10:00 11:30 09:38 10:00 11:30 09:38 10:00 11:30 09:38 11:00 11:30 12:00 11:30 12:00 13:12 12:00 13:12 12:00 13:12 12:00 13:12 12:00 13:12 12:00 13:12 13:39 13:12 13:39 13:12 13:12 13:39 13:12 13:39 13:12 13:12 13:39 13:12 13:39 13:12 13:39 13:40 14:00 14:00 14:00 13:12 13:39 13:40 14:00 14:00 13:12 13:39 13:40 14:00 14:00 13:12	4 4 4 4 4 4 4 4 2: scienc Lat. (So Deg 4 4 4 4	46.40 43.93 45.65 1.96 47.13 47.54 47.91 47.96 47.29 47.42 47.42 47.42 48.42 48.55 48.42 45.98	12 12 12 12 12 12 12 12 12 12 12 12 12 1	27.90 28.26 27.18 25.55 25.52 25.08 24.72 24.69 24.16 24.09 24.16 24.09 24.16 West) 23.01	351 110 132 134 128 132 130 131 134 135 183 CMG 312 045	111.1 8.4 9.5 1.6 1.4 5.7 2.2 2.4 1.6 2.8 2.3 SMG 2.1 2.1 2.1	2681 3054 3012 2773 2780 2807 2859 2874 2909 2959 2959 2959 2959 2959 2959	29		Layback	Altitude	slow to deploy USBL slow transit to transponder deployment who knows!!! transponder D in water weight in water - eventually!!!! Transponder D on bottom Comments end of transponder test survey transit to CTD05 (at 5knts) sensor plugged in CTD in water stopped @ 50m CTD software problems CTD coming up CTD suspended to restart and reset software CTD back in water, to 5m CTD going down 20m/min to 100m CTD at 100m hold for computer restart, now lost graphical interf CTD going down, no plots but digital data, background nephels ar	90.379-90.352
CTD05 065 14:45 4 45.36 12 23.41 124 1.0 3127 Drifting to correct position	Swath transit transit TX01 TX01 TX01 TX01 TX01 TX01 TX01 TX01	065 065 065 065 065 065 065 065 065 065	08:00 08:15 09:30 09:31 09:30 09:38 10:00 10:00 11:30 09:38 10:00 11:30 09:38 10:00 11:30 09:38 11:00 11:30 12:00 11:30 12:00 13:12 12:00 13:12 12:00 13:12 12:00 13:12 12:00 13:12 12:00 13:12 13:39 13:12 13:39 13:12 13:12 13:39 13:12 13:39 13:12 13:12 13:39 13:12 13:39 13:12 13:39 13:40 14:00 14:00 14:00 13:12 13:39 13:40 14:00 14:00 13:12 13:39 13:40 14:00 14:00 13:12	4 4 4 4 4 4 4 4 4 4 4 2: science Lat. (Sc Deg 4 4 4 4 4 4 4	46.40 43.93 45.65 1.96 47.13 47.54 47.91 47.96 47.29 47.42 47.42 47.42 48.42 48.55 48.42 45.98	12 12 12 12 12 12 12 12 12 12 12 12 12 1	27.90 28.26 27.18 25.55 25.52 25.08 24.72 24.69 24.16 24.09 24.16 24.09 24.16 West) 23.01	351 110 132 134 128 132 130 131 134 135 183 CMG 312 045	111.1 8.4 9.5 1.6 1.4 5.7 2.2 2.4 1.6 2.8 2.3 SMG 2.1 2.1 2.1	2681 3054 3012 2773 2780 2807 2859 2874 2909 2959 2959 2959 2959 2959 2959	29		Layback	Altitude	slow to deploy USBL slow transit to transponder deployment who knows!!! transponder D in water weight in water - eventually!!!! Transponder D on bottom Comments end of transponder test survey transit to CTD05 (at 5knts) sensor plugged in CTD in water stopped @ 50m CTD software problems CTD coming up CTD suspended to restart and reset software CTD back in water, to 5m CTD going down 20m/min to 100m CTD at 100m hold for computer restart, now lost graphical interf CTD going down, no plots but digital data, background nephels ar Off position by .5 miles, we are drifting back that way, ship wil do i	90.379-90.352
	Swath transit transit TX01 TX01 TX01 TX01 TX01 TX01 TX01 TX01	065 065 065 065 065 065 065 065 065 065	08:00 08:15 09:30 09:38 09:39 10:00 10:04 10:51 11:00 11:30 99 Leg 11:55 12:00 13:19 13:24 13:29 13:24 13:39 13:34 13:39 13:34 13:39	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	46.40 43.93 45.65 1.96 47.13 47.54 47.91 47.94 47.94 47.94 47.94 47.94 47.94 47.94 47.94 47.94 47.94 48.88 20 90 45.98 45.98	12 12 12 12 12 12 12 12 12 12 12 12 12 1	27.90 28.26 27.18 25.55 25.52 24.72 24.69 24.16 24.09 24.16 24.09 24.16 24.09 24.16 24.09 24.16 24.09 24.10 23.01	351 110 132 132 134 128 132 130 131 131 134 135 183 CMG 312 045	11.1 8.4 9.5 1.6 1.4 5.7 2.2 2.4 1.6 2.8 2.3 SMG 2.1 2.1	2681 3054 3012 2773 2780 2807 2859 2874 2937 2959 2874 2959 2874 2959 2874 2959 2824 2624 2622 3209	29		Layback	Altitude	slow to deploy USBL slow transit to transponder deployment who knows!!! transponder D in water weight in water - eventually!!!! Transponder D on bottom Comments end of transponder test survey transit to CTD05 (at 5knts) sensor plugged in CTD in water stopped @ 50m CTD software problems CTD coming up CTD suppended to restart and reset software CTD back in water, to 5m CTD going down 20m/min to 100m CTD going down, no plots but digital data, background nephels ar Off position by .5 miles, we are drifting back that way, ship wil do i Drifting to station	90.379-90.352
Winch stopped at bottom of Cast	Swath transit TX01 TX01 TX01 TX01 TX01 TX01 TX01 TX01	065 065 065 065 065 065 065 065 065 065	08:00 08:10 08:30 09:30 09:31 09:30 09:38 09:38 09:38 09:38 09:38 10:00 10:04 11:55 11:55 12:00 13:12 13:09 13:24 13:29 13:24 13:29 13:24 13:29 13:24 13:27 13:33 13:39 13:24 13:27 13:34 13:27 13:34 13:26 14:04 14:30	4 4 4 4 4 4 4 4 4 2: science Lat. (Socience Deg 4 4 4 4 4 4 4 4 4 4 4 4 4	46.40 43.93 45.65 1.96 47.13 47.54 47.91 47.94 47.94 47.94 47.94 47.94 47.94 47.94 48.48 48.48 48.42 48.48 48.55 48.42 45.98	12 12 12 12 12 12 12 12 12 12 12 12 12 1	27.90 28.26 27.18 25.55 25.52 25.08 24.72 24.69 24.16 24.09 24.16 24.09 24.10 23.01 23.01 23.01 23.20	351 110 132 134 138 134 138 131 134 135 183 045 045 045	11.1 8.4 9.5 1.6 1.4 5.7 2.2 2.4 1.6 2.8 2.3 2.3 5.7 5.7 5.7 5.7 5.7 5.7 5.7 5.7 5.7 5.7	2681 3054 3012 2773 2780 2859 2874 2937 2959 2959 Wat. deptl 2624 2622 3209 3209	29		Layback	Altitude	slow to deploy USBL slow transit to transponder deployment who knows!!! transponder D in water weight in water - eventually!!!! Transponder D on bottom Comments end of transponder test survey transit to CTD05 (at 5knts) sensor plugged in CTD in water stopped @ 50m CTD software problems CTD coming up CTD auspended to restart and reset software CTD back in water, to 5m CTD ack in water, to 5m CTD ack in water, to 5m CTD at 100m hold for computer restart, now lost graphical interf CTD position by .5 miles, we are drifting back that way, ship wil do i Drifting to station	90.379-90.352
	Swath transit TX01 TX01 TX01 TX01 TX01 TX01 TX01 TX01	065 065 065 065	08:00 08:30 08:31 09:35 09:30 09:30 09:38 09:38 09:38 09:38 10:00 09:38 10:00 10:04 10:51 11:00 11:05 11:00 11:05 11:00 13:12 13:09 13:12 13:39 13:24 13:24 13:27 13:39 13:24 13:27 13:39 13:24 13:27 13:39 13:24 13:27 13:39 13:24 13:27 13:39 13:24 13:27 13:39 13:24 13:27 13:39 13:24 13:27	4 4 4 4 4 4 4 4 4 2: science Lat. (Socience Deg 4 4 4 4 4 4 4 4 4 4 4 4 4	46.40 43.93 45.65 1.96 47.13 47.54 47.91 47.94 47.94 47.94 47.94 47.94 47.94 47.94 48.48 48.48 48.42 48.48 48.55 48.42 45.98	12 12 12 12 12 12 12 12 12 12 12 12 12 1	27.90 28.26 27.18 25.55 25.52 25.08 24.72 24.69 24.16 24.09 24.16 24.09 24.10 23.01 23.01 23.01 23.20	351 110 132 134 138 134 138 131 134 135 183 045 045 045	11.1 8.4 9.5 1.6 1.4 5.7 2.2 2.4 1.6 2.8 2.3 2.3 5.7 5.7 5.7 5.7 5.7 5.7 5.7 5.7 5.7 5.7	2681 3054 3012 2773 2780 2859 2874 2937 2959 2959 Wat. deptl 2624 2622 3209 3209	29		Layback	Altitude	slow to deploy USBL slow transit to transponder deployment who knows!!! transponder D in water weight in water - eventually!!!! Transponder D on bottom Comments end of transponder test survey transit to CTD05 (at 5knts) sensor plugged in CTD in water stopped @ 50m CTD software problems CTD osuspended to restart and reset software CTD suspended to restart and reset software CTD back in water, to 5m CTD going down 20m/min to 100m CTD at 100m hold for computer restart, now lost graphical interf CTD going down. 20m/min to 100m CTD at 100m hold for computer restart, now lost graphical interf CTD going down. 20m/min to 100m CTD going town. oplots but digital data, background nephels ar Off position by .5 miles, we are drifting back that way, ship wil do i Drifting to station Drifting to correct position	90.379-90.352

CTD05	065	14:53	4	45.89		r		1	3146					Fire bottles 1 and 2	
CTD05	065	14:53	4	45.89	12	23.46			3140					Software crash as tried to fire	
	065		4	45.09	12	23.40									
CTD05		14:58	4	45.98	40	00.57	122	4.5	0740					CTD coming up, BROKEN!	
CTD05	065	15:30	4	45.98	12	23.57	122	1.5	2712					CTD coming up	
CTD05	065	15:52												on surface one bottle fired	
CTD05	065	15:54												On deck	
CTD05														unplug sensor	
Transit	065	16:06												in transit to BGT01	
Transit	065	16:30	4	43.82	12	24.62	355	3.7	3205					in transit to BGT01	
BGT01	065	16:45	4	43.01	12	24.99	129	0.8	3249					On station BGT01	
BGT01	065	17:10	4	43.26	12	25.07	129	1.7	3237	21				BGT in water	
BGT01	065	17:13							3056	70				nB Clock on bgt is ship +30 minutes	
BGT01	065	17:30	4	43.42	12	24.97	117	2.5	3113	383	392			Excursions on all analog traces(Trans, neph and alt0	
BGT01	065	18:00	4	43.56	12	24.62	112	2.1	3207	1051	1054			bGTstill malfunctioning	
BGT01	065	18:12		10.00		2	110	1.8	3292	1310	1302	335		Veer increaseto 30 m/min	
BGT01	065	18:30	4	43.70	12	24.30	112	2.1	3291	1856	1865	000			
BGT01	065	18:32	4	43.70	12	24.00	112	2.1	3231	1000	1005			Reboot BRIDGET, try to kickstart analogue Tx/Rx. No A value	
BGT01	065	18:35													
														No change. Reboot logging.	
BGT01		18:36		40.00						0750	0700	505		No result. Proceed to fulldepth, then recovery.	
BGT01	065	19:01	4	43.80	12	23.90	112	2.1	3238	2750	2720	595		Winch stop	
BGT01	065	19:05								2750				Fire bottle no.1 - confirmed	
BGT01	065	19:07												veer at 30m/m	
BGT01	065	19:13								2923				stop winch	
BGT01	065	19:15												haul at 45m/m to targeth depth 2800m	
BGT01	065	19:17								2802				fire bottle no.2 - confirmed - haul at 45m/m	
BGT01	065	19:19								2751				fire bottle no. 3 - confirmed	
BGT01	065	19:21								2701				fire bottle no. 4 - confirmed	
BGT01	065	19:23								2651				fire bottle no. 5- confirmed	
BGT01	065	19:26								2599				fire bottle no. 6 - confirmed	
BGT01	065	19:28								2545				fire bottle no. 7 - confirmed	
BGT01	065	20:00	4	44.42	12	23.12	116	2.6	3234	1238				resume recovery	
BGT01	065	20:05				20.12		2.0	0201	1024				fire bottle no. 8 - confirmed	
BGT01	065	20:05								1024				fire bottle no. 9 - confirmed	
BGT01	065	20:00								1024					
														fire bottle no. 10 - confirmed	
BGT01	065	20:08								1024				fire bottle no. 11 - confirmed	
BGT01 BGT01	065 065	20:08 20:16		44.70	40	00.05		47	0400	1024			-		
BGT01 BGT01 BGT01	065 065 065	20:08 20:16 20:31	4	44.73	12	23.05	114	1.7	3189	1024 450				fire bottle no. 11 - confirmed Resume haul 35m/m	
BGT01 BGT01	065 065 065 065	20:08 20:16 20:31 20:55			12	23.05	114	1.7	3189	1024				fire bottle no. 11 - confirmed	
BGT01 BGT01 BGT01	065 065 065 065	20:08 20:16 20:31 20:55	: sciend	ce log			114	1.7	3189	1024 450 -12				fire bottle no. 11 - confirmed Resume haul 35m/m	
BGT01 BGT01 BGT01 BGT01	065 065 065 065 CD10	20:08 20:16 20:31 20:55 69 Leg2	2: scienc Lat. (So	ce log outh)	Long. ((West)				1024 450 -12 BRIDGET				fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck	
BGT01 BGT01 BGT01	065 065 065 CD10 Jday	20:08 20:16 20:31 20:55 69 Leg2	2: scienc Lat. (So Deg	ce log outh) Min	Long. (Deg	(West) Min	CMG	SMG	Wat. dept	1024 450 -12		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m	
BGT01 BGT01 BGT01 BGT01 Operation	065 065 065 CD10 Jday 065	20:08 20:16 20:31 20:55 69 Leg2 Time 21:00	2: scienc Lat. (So Deg 4	ce log outh) Min 44.95	Long. (Deg 12	(West) Min 23.05	CMG 120	SMG 1.0	Wat. depti 3145	1024 450 -12 BRIDGET		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck Comments	
BGT01 BGT01 BGT01 BGT01 Operation transit	065 065 065 CD10 Jday 065 065	20:08 20:16 20:31 20:55 69 Leg2 Time 21:00 21:30	2: scienc Lat. (So Deg 4 4	ce log buth) Min 44.95 45.97	Long. (Deg 12 12	(West) Min 23.05 22.48	CMG 120 124	SMG 1.0 4.4	Wat. dept 3145 3097	1024 450 -12 BRIDGET		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck Comments Transit to transponder A Deployment	
BGT01 BGT01 BGT01 BGT01 Operation transit TX02	065 065 065 CD10 Jday 065 065	20:08 20:16 20:31 20:55 69 Leg2 Time 21:00 21:30 22:00	2: science Lat. (So Deg 4 4 4	ce log buth) Min 44.95 45.97 47.07	Long. (Deg 12 12 12 12	(West) Min 23.05 22.48 21.53	CMG 120 124 116	SMG 1.0 4.4 2.1	Wat. deptl 3145	1024 450 -12 BRIDGET		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck Comments Transit to transponder A Deployment Slowing down for deployment	
BGT01 BGT01 BGT01 BGT01 Operation transit TX02 TX02	065 065 065 CD10 Jday 065 065 065	20:08 20:16 20:31 20:55 69 Leg2 Time 21:00 21:30 22:00 22:08	2: scienc Lat. (So Deg 4 4	ce log buth) Min 44.95 45.97	Long. (Deg 12 12	(West) Min 23.05 22.48	CMG 120 124	SMG 1.0 4.4	Wat. dept 3145 3097	1024 450 -12 BRIDGET		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck Comments Transit to transponder A Deployment slowing down for deployment At transponder B station	
BGT01 BGT01 BGT01 BGT01 Operation transit TX02 TX02	065 065 065 CD10 Jday 065 065 065 065	20:08 20:16 20:31 20:55 69 Leg2 Time 21:00 21:30 22:00 22:08 22:10	2: scienc Lat. (So Deg 4 4 4 4	buth) Min 44.95 45.97 47.07 47.19	Long. (Deg 12 12 12 12 12	(West) Min 23.05 22.48 21.53 21.42	CMG 120 124 116 119	SMG 1.0 4.4 2.1 1.5	Wat. dept 3145 3097	1024 450 -12 BRIDGET		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck Comments Transit to transponder A Deployment slowing down for deployment At transponder B station Transponder B in water	
BGT01 BGT01 BGT01 BGT01 Operation transit TX02 TX02	065 065 065 CD10 Jday 065 065 065 065 065	20:08 20:16 20:31 20:55 69 Leg2 Time 21:00 21:30 22:00 22:08 22:10 22:20	2: scienc Lat. (So Deg 4 4 4 4 4	ce log Min 44.95 45.97 47.07 47.19 47.28	Long. (Deg 12 12 12 12 12 12	(West) Min 23.05 22.48 21.53 21.42 21.33	CMG 120 124 116 119 116	SMG 1.0 4.4 2.1 1.5 -	Wat. dept 3145 3097	1024 450 -12 BRIDGET		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck Comments Transit to transponder A Deployment slowing down for deployment At transponder B station Transponder B in water weight in water - transit to transponder a deployment	
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BGT01 BGT01 BGT01 BGT01 Coperation transit TX02 TX02 TX02 TX02 transit TX03 TX03 TX03 transit	065 065 065 CD10 065 065 065 065 065 065 065 065 065 065	20:08 20:16 20:31 20:55 69 Leg2 Time 21:00 21:30 22:00 22:08 22:10 22:20 22:30 23:00 23:16 23:21 23:30	2: scienc Lat. (So Deg 4 4 4 4 4 4 4 4 4 4 4	22 log 24.95 45.97 47.07 47.19 47.28 47.60 49.45 49.53 49.53	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12	West) Min 23.05 22.48 21.53 21.42 21.33 21.49 22.50 22.50 22.50 22.47	CMG 120 124 116 119 116 188 189 099 107	SMG 1.0 4.4 2.1 1.5 5.0 2.9 2.5 3.0	Wat. dept 3145 3097	1024 450 -12 BRIDGET		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck Comments Transit to transponder A Deployment slowing down for deployment At transponder B station Transponder B in water weight in water - transit to transponder a deployment Slowing down for deployment Transponder A in water Weight in water - transit to survey-in transponder B Transponder A survey-in	
BGT01 BGT01 BGT01 BGT01 Operation Transit TX02 TX02 TX02 TX02 TX02 TX03 TX03 TX03 Tx03 Tx03 Tx03	065 065 065 065 065 065 065 065 065 065	20:08 20:16 20:31 20:55 69 Leg2 Time 21:00 21:30 22:08 22:10 22:08 22:10 22:20 22:30 23:21 23:30 23:21 23:30	2: scienc Lat. (So Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Dece log buth) Min 44.95 45.97 47.07 47.19 47.28 47.60 49.53 49.43	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 23.05 22.48 21.53 21.42 21.33 21.49 22.50 22.50 22.50 22.47 22.38	CMG 120 124 116 119 116 188 189 099 107 056	SMG 1.0 4.4 2.1 1.5 5.0 2.9 2.5 3.0 3.4	Wat. dept 3145 3097	1024 450 -12 BRIDGET		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck BRIDGET on deck Comments Transit to transponder A Deployment Slowing down for deployment At transponder B in water weight in water - transit to transponder a deployment Transit to transponder A deployment Slowing down for deployment Transponder A in water Weight in water - transit to survey-in transponder B Transponder A in water Weight in water - transit to survey-in transponder B Transponder A matter Weight in water - transit to survey-in transponder B Transponder A matter	
BGT01 BGT01 BGT01 BGT01 Tota TX02 TX02 TX02 TX02 TX02 TX02 TX02 TX03 TX03 TX03 transit hove-to hove-to	065 065 065 065 065 065 065 065 065 065	20:08 20:16 20:31 20:55 69 Leg2 21:00 21:30 22:00 22:00 22:00 22:00 22:00 22:20 22:30 23:16 23:20 23:16 23:32 23:32 00:00	2: scienc Lat. (So Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	See log buth) Min 44.95 45.97 47.19 47.28 47.60 49.45 49.53 49.43 48:96	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 23.05 22.48 21.53 21.42 21.33 21.49 22.50 22.50 22.50 22.47 22.38 0.95	CMG 120 124 116 119 116 188 189 099 107 056 117	SMG 1.0 4.4 2.1 1.5 5.0 2.9 2.5 3.0 3.4 2.1	Wat. dept 3145 3097	1024 450 -12 BRIDGET		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck BRIDGET on deck Comments Transit to transponder A Deployment Slowing down for deployment At transponder B station Transponder B in water weight in water - transit to transponder a deployment Slowing down for deployment Transponder A in water Weight in water - transit to survey-in transponder B Transponder A survey-in Hove-to - problems "hearing" transponder A Hove-to	
BGT01 BGT01 BGT01 BGT01 Uperation Transit TX02 TX02 TX02 TX02 TX02 TX03 TX03 TX03 Transit hove-to hove-to TX02	065 065 065 065 065 065 065 065 065 065	20:08 20:16 20:31 20:55 69 Leg2 7 11:00 21:30 22:00 22:08 22:10 22:20 22:20 22:30 23:16 23:21 23:30 23:32 00:00 00:24	2: scienc Lat. (So Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Se log buth) Min 44.95 45.97 47.07 47.19 47.28 47.60 49.45 49.53 49.43 48.96 49.16	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 23.05 22.48 21.53 21.42 21.33 21.49 22.50 22.50 22.47 22.38 0.95 22.41	CMG 120 124 116 119 116 188 189 099 107 056 117 100	SMG 1.0 4.4 2.1 1.5 5.0 2.9 2.5 3.0 3.4	Nat. depti 3145 3097 2977	1024 450 -12 BRIDGET		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck Comments Transit to transponder A Deployment slowing down for deployment At transponder B station Transponder B in water weight in water - transit to transponder a deployment Slowing down for deployment Transponder A in water Weight in water - transit to survey-in transponder B Transponder A survey-in Hove-to - problems "hearing" transponder A Hove-to moving to start surveying xpdr b	
BGT01 BGT01 BGT01 BGT01 Uperation Transit TX02 TX02 TX02 TX02 transit TX03 TX03 TX03 TX03 TX03 TX03 TX03 TX03	065 065 065 065 065 065 065 065 065 065	20:08 20:16 20:31 20:55 69 Leg2 Time 21:00 22:00 22:08 22:10 22:08 22:10 22:20 22:30 23:00 23:16 23:21 23:30 23:16 23:21 23:30 23:32 00:00 00:24 02:00	2: scienc Lat. (So Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	2e log Min 44.95 45.97 47.07 47.19 47.28 47.60 49.45 49.53 49.53 49.53 49.53 49.53 49.53 49.43	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 23.05 22.48 21.53 21.42 21.33 21.49 22.50 22.50 22.47 22.38 0.95 0.95 22.41 22.27	CMG 120 124 116 119 116 188 189 099 107 056 117 117 100 103	SMG 1.0 4.4 2.1 1.5 5.0 2.9 2.5 3.0 3.4 2.1	Vat. deptl 3145 3097 2977 2977	1024 450 -12 BRIDGET		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck BRIDGET on deck Comments Transit to transponder A Deployment Slowing down for deployment At transponder B in water weight in water - transit to transponder a deployment Transit to transponder A deployment Slowing down for deployment Transit to transponder A deployment Transponder B in water Weight in water - transit to survey-in transponder B Transponder A in water Weight in water - transit to survey-in transponder B Transponder A hearing" transponder A Hove-to - problems "hearing" transponder A Hove-to moving to start surveying xpdr b finished surveying xpdr b, moving to drop xpdr A	
BGT01 BGT01 BGT01 BGT01 Coperation TX02 TX02 TX02 TX02 transit TX03 TX03 transit hove-to hove-to TX02 TX02 TX02	065 065 065 065 065 065 065 065 065 065	20:08 20:16 20:31 20:55 69 Leg2 Time 21:00 22:00 22:08 22:10 22:00 22:00 22:30 23:20 23:20 23:21 23:30 23:32 00:00 00:23	2: science Lat. (So Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	See log buth) Min 44.95 45.97 47.07 47.19 47.28 47.60 49.45 49.53 49.53 49.49 49.45 49.53 49.45 49.43 48:96 49.46	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 23.05 22.48 21.53 21.42 21.33 21.49 22.50 22.50 22.47 22.38 0.95 22.41 22.27 22.57	CMG 120 124 116 119 116 188 189 099 107 056 117 100 103 105	SMG 1.0 4.4 2.1 1.5 5.0 2.9 2.5 3.0 3.4 2.1	Wat. depti 3145 3097 2977 2977 2977 2978 2978	1024 450 -12 BRIDGET		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck BRIDGET on deck Comments Comments Transponder A Deployment Slowing down for deployment At transponder B in water Weight in water - transit to transponder A deployment Slowing down for deployment Transponder A in water Weight in water - transit to survey-in transponder B Transponder A survey-in Hove-to - problems "hearing" transponder A Hove-to moving to start surveying xpdr b finished surveying xpdr A Survey A S	
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BGT01 BGT01 BGT01 BGT01 Uperation Transit TX02 TX02 TX02 TX02 TX02 TX03 TX03 TX03 TX03 TX03 TX03 TX03	065 065 065 065 065 065 065 065 065 065	20:08 20:16 20:31 20:55 59 Leg2 21:00 22:00 22:00 22:00 22:00 22:00 22:00 22:00 22:00 22:00 23:00 23:02 23:16 23:21 23:30 23:21 23:30 00:00 00:24 00:00 02:24 00:240 00:415	2: science Lat. (So Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	See log buth) Min 44.95 45.97 47.07 47.19 47.28 47.60 49.45 49.53 49.53 49.49 49.45 49.53 49.45 49.43 48:96 49.46	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 23.05 22.48 21.53 21.42 21.33 21.49 22.50 22.50 22.47 22.38 0.95 22.41 22.27 22.57	CMG 120 124 116 119 116 188 189 099 107 056 117 100 103 105	SMG 1.0 4.4 2.1 1.5 5.0 2.9 2.5 3.0 3.4 2.1	Wat. depti 3145 3097 2977 2977 2977 2978 2978	1024 450 -12 BRIDGET		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck BRIDGET on deck Comments Transit to transponder A Deployment Slowing down for deployment At transponder B in water weight in water - transit to transponder a deployment Slowing down for deployment Transpinder A to transponder a deployment Slowing down for deployment Transpinder A in water Weight in water - transit to survey-in transponder B Transponder A in water Weight in water - transit to survey-in transponder A Hove-to - problems "hearing" transponder A Hove-to moving to start surveying xpdr b Started to stream xpdr A xpdr a weight away Heaving to for USBL pod recovery	
BGT01 BGT01 BGT01 BGT01 Uperation Tx02 TX02 TX02 TX02 TX02 TX03 TX03 TX03 TX03 TX03 TX03 TX03 TX03	065 065 065 CD10 065 065 065 065 065 065 065 065 065 065	20:08 20:16 20:31 20:55 59 Leg2 59 Leg2 20:08 22:00 22:00 22:00 22:00 22:00 22:00 22:00 22:00 22:00 22:00 23:00 23:01 24:0124:01 24:	2: science Lat. (So Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Le log buth) Min 44.95 45.97 47.07 47.07 47.19 47.28 47.60 49.45 49.53 49.49 48.96 48.20 49.46 49.53 50.34	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 23.05 22.48 21.53 21.42 21.33 21.49 22.50 22.50 22.50 22.50 22.50 22.50 22.57 22.38 0.95 22.41 22.27 22.57 22.47 23.70	CMG 120 124 116 119 116 188 189 099 107 056 107 056 117 100 103 105 108 152	SMG 1.0 4.4 2.1 1.5 5.0 2.9 2.9 2.9 3.0 3.4 2.1 2.4	Vat. deptl 3145 3097 2977 2977 2978 2978 2977 2977 2918	1024 450 -12 BRIDGET		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck BRIDGET on deck Comments Transit to transponder A Deployment slowing down for deployment At transponder B station Transponder B station Transponder B in water weight in water - transit to transponder a deployment Slowing down for deployment Transponder A in water Weight in water - transit to survey-in transponder B Transit to transponder A survey-in How-to - problems "hearing" transponder A How-to moving to start surveying xpdr b finished' surveying xpdr b finished' surveying xpdr b At the survey of A Started to stream xpdr A	
BGT01 BGT01 BGT01 BGT01 Uperation Transit TX02 TX02 TX02 TX02 TX03 TX03 TX03 TX03 TX03 TX03 TX03 TX03	065 065 065 065 065 065 065 065 065 065	20:08 20:16 20:31 20:55 39 Leg2 20:55 20:02 21:30 22:00 22:00 22:00 22:00 22:00 22:00 22:00 22:00 22:00 22:00 22:00 23:00 23:01 20:00 23:01 23:01 23:01 20:00 20:00 23:01 23:01 20:00 20:0	2: science Lat. (So Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Se log buth) Min 44.95 45.97 47.19 47.28 47.60 49.53 49.53 49.16 48.96 49.16 49.53 50.34 50.70	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 23.05 22.48 21.53 21.42 21.33 21.49 22.50 22.50 22.47 22.38 0.95 22.41 22.27 22.57 22.41 22.57 22.47 23.70 24.30	CMG 120 124 116 119 116 188 189 099 107 056 056 117 100 103 105 108	SMG 1.0 4.4 2.1 1.5 5.0 2.9 2.5 3.0 3.4 2.1	Vat. deptl 3145 3097 2977 2977 2978 2978 2977 2977	1024 450 -12 BRIDGET		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck BRIDGET on deck Comments Comments Transit to transponder A Deployment Slowing down for deployment At transponder B in water Weight in water - transit to transponder a deployment Transponder B in water Weight in water - transit to transponder a deployment Transponder A survey-in Transponder A survey-in Hove-to - problems "hearing" transponder A Hove-to moving to start surveying xpdr b finished surveying xpdr b started to stream xpdr A Xpdr a weight away Heaving to FULL Survey-in Heaving to FULL Survey-in Heaving to FULL Survey-in Transponder A survey-in Hove-to Transponder A survey-in Started to stream xpdr A Started to stream xpdr A Started to Stream xpdr A Started to TUBM point Transit to TUBM point Transit to TUBM point Transit to transponder A Started to Stream xpdr A	
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BGT01 BGT01 BGT01 BGT01 Uperation Tx02 TX02 TX02 TX02 TX02 TX02 TX03 TX03 TX03 TX03 TX03 TX03 TX03 TX03	065 065 065 065 065 065 065 065 065 065	20:08 20:16 20:31 20:55 59 Leg2 20:07 21:30 22:00 22:08 22:00 20:01 22:00 20:01 22:00 20:01 22:00 20:01 20:00 20:0	2: science Lat. (So Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Se log buth) Min 44.95 45.97 47.19 47.28 47.60 49.53 49.53 49.16 48.96 49.16 49.53 50.34 50.70	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 23.05 22.48 21.53 21.42 21.33 21.49 22.50 22.50 22.47 22.38 0.95 22.41 22.27 22.57 22.41 22.57 22.47 23.70 24.30	CMG 120 124 116 119 116 188 189 099 107 056 107 056 117 100 103 105 108 152	SMG 1.0 4.4 2.1 1.5 5.0 2.9 2.9 2.9 3.0 3.4 2.1 2.4	Vat. deptl 3145 3097 2977 2977 2978 2978 2977 2977 2918	1024 450 -12 BRIDGET		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck BRIDGET on deck Comments Transit to transponder A Deployment slowing down for deployment At transponder B station Transponder B station Transponder B in water weight in water - transit to transponder a deployment Slowing down for deployment Transponder A in water Weight in water - transit to survey-in transponder B Transt to transponder A survey-in transponder A Hove-to moving to start surveying xpdr b finished' surveying xpdr b finished' surveying xpdr b Started to stream xpdr A Xpdr a weight away Heaving to for USBL pod recovery Underway for DLM 01 deployment Transit to DLM 01 Weight in water	
BGT01 BGT01 BGT01 BGT01 Uperation Transit TX02 TX02 TX02 TX02 TX02 TX03 TX03 TX03 TX03 TX03 TX03 TX03 TX03	065 065 065 065 065 065 065 065 065 065	2008 2016 2017 2017 2017 2015 59 Le22 2100 2200 22100 22100 22100 22100 22100 22100 22100 22100 22100 22100 22100 2316 2316 2321 2330 23316 23316 23316 23316 23316 23316 23316 23316 23316 23316 23317 2330 2330 2330 2330 2330 2330 2330 233	2: science Lat. (So Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Se log buth) Min 44.95 45.97 47.19 47.28 47.60 49.53 49.53 49.16 48.96 49.16 49.53 50.34 50.70	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 23.05 22.48 21.53 21.42 21.33 21.49 22.50 22.50 22.47 22.38 0.95 22.41 22.27 22.57 22.41 22.57 22.47 23.70 24.30	CMG 120 124 116 119 116 188 189 099 107 056 107 056 117 100 103 105 108 152	SMG 1.0 4.4 2.1 1.5 5.0 2.9 2.9 2.9 3.0 3.4 2.1 2.4	Vat. deptl 3145 3097 2977 2977 2978 2978 2977 2977 2918	1024 450 -12 BRIDGE1 Wire Out		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck BRIDGET on deck Comments Comments Transit to transponder A Deployment Slowing down for deployment At transponder B in water weight in water - transit to transponder a deployment Transponder B in water Weight in water - transit to transponder a deployment Transponder A in water Weight in water - transit to survey-in transponder B Transponder A survey-in Hove-to - problems "hearing" transponder A Howe-to moving to start surveying xpdr b finished surveying xpdr b Started to stream xpdr A Xpdr a weight away Heaving to for USBL pod recovery Underway for DUM 01 deployment Weight in water Pinger on	
BGT01 BGT01 BGT01 BGT01 Doperation Transit TX02 TX02 TX02 TX02 TX02 TX02 TX02 TX03 TX03 TX03 TX03 TX03 TX03 TX03 TX03	065 065 065 065 065 065 065 065 065 065	2008 20:16 20:31 20:55 20:32 2	2: science Lat. (So Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Se log buth) Min 44.95 45.97 47.19 47.28 47.60 49.53 49.53 49.16 48.96 49.16 49.53 50.34 50.70	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 23.05 22.48 21.53 21.42 21.33 21.49 22.50 22.50 22.47 22.38 0.95 22.41 22.27 22.57 22.41 22.57 22.47 23.70 24.30	CMG 120 124 116 119 116 188 189 099 107 056 107 056 117 100 103 105 108 152	SMG 1.0 4.4 2.1 1.5 5.0 2.9 2.9 2.9 3.0 3.4 2.1 2.4	Vat. deptl 3145 3097 2977 2977 2978 2978 2977 2977 2918	1024 450 -12 BRIDGEI Wire Out		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck BRIDGET on deck Comments Transit to transponder A Deployment Slowing down for deployment Slowing down for deployment At transponder B in water weight in water - transit to transponder a deployment Transponder B in water Weight in water - transit to survey-in transponder B Transponder A in water Weight in water - transit to survey-in transponder B Transponder A in water Weight in water - transit to survey-in transponder A Hove-to - problems "hearing" transponder A Hove-to moving to start surveying xpdr b finished surveying xpdr b finished surveying xpdr b finished surveying xpdr b finished surveying xpdr b, moving to drop xpdr A started to stream xpdr A xpdr a weight away Heaving to for USBL pod recovery Underway for DUM 01 deployment site (Shallowest at 2475m) O n station DUM 01 Weight in water Pinger on MAPR 12 on wire	
BGT01 BGT01 BGT01 BGT01 Transit TX02 TX02 TX02 TX02 TX02 TX02 TX03 TX03 TX03 TX03 TX03 TX03 TX03 TX03	065 065 065 065 065 065 065 065 065 065	2008 2016 2016 2031 2055 99 Le2 2100 2208 2210 22208 2210 22208 2210 22208 2210 22208 2210 22208 2210 22208 2210 2230 2316 2320 2316 2320 2316 2320 2320 2320 2320 2320 2320 2320 232	2: science Lat. (So Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Se log buth) Min 44.95 45.97 47.19 47.28 47.60 49.53 49.53 49.16 48.96 49.16 49.53 50.34 50.70	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 23.05 22.48 21.53 21.42 21.33 21.49 22.50 22.50 22.47 22.38 0.95 22.41 22.27 22.57 22.41 22.57 22.47 23.70 24.30	CMG 120 124 116 119 116 188 189 099 107 056 107 056 117 100 103 105 108 152	SMG 1.0 4.4 2.1 1.5 5.0 2.9 2.9 2.9 3.0 3.4 2.1 2.4	Vat. deptl 3145 3097 2977 2977 2978 2978 2977 2977 2918	1024 450 -12 BRIDGET Wire Out		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck BRIDGET on deck Comments Transit to transponder A Deployment slowing down for deployment At transponder B station Transponder B station Transponder B in water weight in water - transit to transponder a deployment Slowing down for deployment Transponder A in water Weight in water - transit to survey-in transponder B Transt to transponder A survey-in transponder A Hove-to moving to start surveying xpdr b finished surveying xpdr b finished surveying xpdr b tinder a weight away Heaving to for USBL pod recovery Underway for DUM 01 deployment Transit to DUM 01 deployment Transit to DUM 01 deployment Pinger on MAPR 12 on wire	
BGT01 BGT01 BGT01 BGT01 Doperation Transit TX02 TX02 TX02 TX02 TX02 TX02 TX02 TX03 TX03 TX03 TX03 TX03 TX03 TX03 TX03	065 065 065 065 065 065 065 065 065 065	2008 20:16 20:31 20:55 20:32 2	2: science Lat. (So Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Se log buth) Min 44.95 45.97 47.19 47.28 47.60 49.53 49.53 49.16 48.96 49.16 49.53 50.34 50.70	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 23.05 22.48 21.53 21.42 21.33 21.49 22.50 22.50 22.47 22.38 0.95 22.41 22.27 22.57 22.41 22.57 22.47 23.70 24.30	CMG 120 124 116 119 116 188 189 099 107 056 107 056 117 100 103 105 108 152	SMG 1.0 4.4 2.1 1.5 5.0 2.9 2.9 2.9 3.0 3.4 2.1 2.4	Vat. deptl 3145 3097 2977 2977 2978 2978 2977 2977 2918	1024 450 -12 BRIDGEI Wire Out		Layback	Altitude	fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck BRIDGET on deck Comments Transit to transponder A Deployment Slowing down for deployment Slowing down for deployment At transponder B in water weight in water - transit to transponder a deployment Transponder B in water Weight in water - transit to survey-in transponder B Transponder A in water Weight in water - transit to survey-in transponder B Transponder A in water Weight in water - transit to survey-in transponder A Hove-to - problems "hearing" transponder A Hove-to moving to start surveying xpdr b finished surveying xpdr b finished surveying xpdr b finished surveying xpdr b finished surveying xpdr b, moving to drop xpdr A started to stream xpdr A xpdr a weight away Heaving to for USBL pod recovery Underway for DUM 01 deployment site (Shallowest at 2475m) O n station DUM 01 Weight in water Pinger on MAPR 12 on wire	
BGT01 BGT01 BGT01 BGT01 Transit TX02 TX02 TX02 TX02 TX02 TX02 TX03 TX03 TX03 TX03 TX03 TX03 TX03 TX03	065 065 065 065 065 065 065 065 065 065	2008 2016 2016 2031 2055 99 Le2 2100 2208 2210 22208 2210 22208 2210 22208 2210 22208 2210 22208 2210 22208 2210 2230 2316 2320 2316 2320 2320 2316 2320 2320 2320 2320 2320 2320 2320 232	2: science Lat. (So Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Se log buth) Min 44.95 45.97 47.19 47.28 47.60 49.53 49.53 49.16 48.96 49.16 49.53 50.34 50.70	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 23.05 22.48 21.53 21.42 21.33 21.49 22.50 22.50 22.47 22.38 0.95 22.41 22.27 22.57 22.41 22.57 22.47 23.70 24.30	CMG 120 124 116 119 116 188 189 099 107 056 107 056 117 100 103 105 108 152	SMG 1.0 4.4 2.1 1.5 5.0 2.9 2.9 2.9 3.0 3.4 2.1 2.4	Vat. deptl 3145 3097 2977 2977 2978 2978 2977 2977 2918	1024 450 -12 BRIDGET Wire Out		Layback		fire bottle no. 11 - confirmed Resume haul 35m/m BRIDGET on deck BRIDGET on deck Comments Transit to transponder A Deployment slowing down for deployment At transponder B station Transponder B station Transponder B in water weight in water - transit to transponder a deployment Slowing down for deployment Transponder A in water Weight in water - transit to survey-in transponder B Transt to transponder A survey-in transponder A Hove-to moving to start surveying xpdr b finished surveying xpdr b finished surveying xpdr b tinder a weight away Heaving to for USBL pod recovery Underway for DUM 01 deployment Transit to DUM 01 deployment Transit to DUM 01 deployment Pinger on MAPR 12 on wire	

DUM1	066	06:00						1		258				MAPR 8 on wire		
DUM1	066	06:05								308				MAPR 9 on wire		
DUM1	066	06:08	4	49.70	12	26.40	129	1.7	2631							
DUM1	066	06:50	4	50.30	12	26.40	133	1.6	2650	2031						
DUM1	066	07:00	4	50.50	12	26.40	132	1.5	2682	2222			400			
DUM1	066	07:12							2688	2300			600	Stopped winch, start survey to WP34		
DUM1	066	07:30	4	50.85	12	25.43	077	4.0	2517	2301			1000			
DUM1	066	07:50	-	00.00	12	20.40	011	2.0	2442	2001				Veer at 30 m/min		
				50.54	- 10								1000(ESt)	veer at 50 m/mm		
DUM1	066	08:00	4	50.54	12	24.41	086	3.1	2540	2663						
DUM1	066	08:05								2750				Winch stopped		
DUM1	066	08:15	4	50.42	12	23.99	088	2.6	2852	2749						
DUM1	066	08:30	4	50.27	12	23.60	061	1.1	2947	2826						
DUM1	066	08:45	4	50.17	12	23.16	094	1.7	3041	3373						
DUM1	066	08:52	+	00.17	12	20.10	004	1.7	0041	0010				Minch stop		
														Winch stop		
DUM1	066	08:53												Haul 40m/min		
DUM1	066	09:00	4	50.06	12	22.80	071	1.1	3013	3374						
DUM1	066	09:10												Winch stop - hove-to		
DUM1	066	09:15	4	49.96	12	22.41	236	0.1	3003	2959						
DUM1	066	09:30	4	44.99	12	22.47	289	0.1		2958						
DUM1	066	09:35	-	14.00	14	22.71	205	0.1	-	2958			400	cable swinging under ship		
				50.00	40	00.47	004	0.0	0000							
DUM1	066	09:38	4	50.02	12	22.47	094	0.3	3968	2958			350			
DUM1	066	09:45												veering		
DUM1	066	09:45	4	50.05	12	22.43	092	0.9	3009		_				I T	
DUM1	066	09:49								3100				winch stop		
DUM1	066	09:58				1	1	1						haul 29m/m		
DUM1	066	10:02						l	l	3000				winch stop		
				40.01	40	00.00	044	0.0	0000							
DUM1	066	10:03	4	49.94	12	22.33	044	0.8	2998	3000				under way 1.5knts		
DUM1	066	10:15	4	49.81	12	22.21	046	1.8	2985	3001						
	CD1	69 Leg2	2: scienc	ce log												
			Lat. (So	outh)	Long. (West)				BRIDGET	l etc					
Operation	Jdav	Time	Deg	Min	Deg	Min	CMG	SMG	Nat. dept	Wire Out	Depth	Layback	Altitude	Comments		
DUM1	066	10:30	4	49.64	12	22.07	016	1.1	2976	3002					1 1	
DUM1	066	10:45	4	49.47	12	21.91	013	1.2	2957	3002	2750	1396				
						21.91	013	1.2	2957	3003	2750	1390				
DUM1	066	11:00	4	49.25	12											
-																
DUM1	066	11:15	4	49.09	12	21.60	053	1.0	2873	3004						
DUM1 DUM1		11:15 11:30														
	066	11:30	4	49.09	12	21.60	053	1.0	2873	3004				Haul 20m/m		
DUM1 DUM1	066 066 066	11:30 11:40	4	49.09	12	21.60	053	1.0	2873	3004 3005 3005						
DUM1 DUM1 DUM1	066 066 066 066	11:30 11:40 11:43	4	49.09 48.90	12 12	21.60 21.39	053 039	1.0 1.1	2873 2932	3004 3005 3005 2950				Haul 20m/m winch stop		
DUM1 DUM1 DUM1 DUM1	066 066 066 066 066	11:30 11:40 11:43 11:45	4	49.09	12	21.60	053	1.0	2873	3004 3005 3005				winch stop		
DUM1 DUM1 DUM1 DUM1 DUM1	066 066 066 066 066	11:30 11:40 11:43 11:45 11:46	4 4 4	49.09 48.90 48.68	12 12 12	21.60 21.39 21.22	053 039 357	1.0 1.1 2.9	2873 2932 2917	3004 3005 3005 2950 2950						
DUM1 DUM1 DUM1 DUM1 DUM1 DUM1	066 066 066 066 066 066	11:30 11:40 11:43 11:45 11:46 12:00	4	49.09 48.90	12 12	21.60 21.39	053 039	1.0 1.1	2873 2932	3004 3005 3005 2950				winch stop A/C for W/P 35		
DUM1 DUM1 DUM1 DUM1 DUM1	066 066 066 066 066	11:30 11:40 11:43 11:45 11:46	4 4 4	49.09 48.90 48.68	12 12 12	21.60 21.39 21.22	053 039 357	1.0 1.1 2.9	2873 2932 2917	3004 3005 3005 2950 2950				winch stop		
DUM1 DUM1 DUM1 DUM1 DUM1 DUM1	066 066 066 066 066 066	11:30 11:40 11:43 11:45 11:46 12:00	4 4 4	49.09 48.90 48.68	12 12 12	21.60 21.39 21.22	053 039 357	1.0 1.1 2.9	2873 2932 2917	3004 3005 3005 2950 2950				winch stop A/C for W/P 35		
DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1	066 066 066 066 066 066 066 066	11:30 11:40 11:43 11:45 11:46 12:00 12:10 12:13	4 4 4 4	49.09 48.90 48.68 48.32	12 12 12 12 12	21.60 21.39 21.22 21.27	053 039 357 315	1.0 1.1 2.9 2.1	2873 2932 2917	3004 3005 3005 2950 2950				winch stop A/C for W/P 35 pinger on bottom trace lost 450 alt veer @20m/min		
DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1	066 066 066 066 066 066 066 066 066	11:30 11:40 11:43 11:45 11:46 12:00 12:10 12:13 12:15	4 4 4	49.09 48.90 48.68	12 12 12	21.60 21.39 21.22	053 039 357	1.0 1.1 2.9	2873 2932 2917	3004 3005 3005 2950 2950				winch stop A/C for W/P 35 pinger on bottom trace lost 450 alt veer @20m/min 40m/min		
DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1	066 066 066 066 066 066 066 066 066	11:30 11:40 11:43 11:45 11:46 12:00 12:10 12:13 12:15 12:18	4 4 4 4	49.09 48.90 48.68 48.32	12 12 12 12 12	21.60 21.39 21.22 21.27	053 039 357 315	1.0 1.1 2.9 2.1	2873 2932 2917	3004 3005 3005 2950 2950				winch stop A/C for W/P 35 pinger on bottom trace lost 450 alt veer @20m/min		
DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1	066 066 066 066 066 066 066 066 066 066	11:30 11:40 11:43 11:45 11:46 12:00 12:10 12:10 12:13 12:15 12:18 12:23	4 4 4 4 4 4 4	49.09 48.90 48.68 48.32 48.10	12 12 12 12 12 12	21.60 21.39 21.22 21.27 21.27 22.00	053 039 357 315 200	1.0 1.1 2.9 2.1 2.0	2873 2932 2917 2873	3004 3005 3005 2950 2950 2450			200	winch stop A/C for W/P 35 pinger on bottom trace lost 450 alt veer @20m/min 40m/min		
DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1	066 066 066 066 066 066 066 066 066 066	11:30 11:40 11:43 11:45 11:46 12:00 12:10 12:13 12:15 12:18 12:23 12:30	4 4 4 4	49.09 48.90 48.68 48.32	12 12 12 12 12	21.60 21.39 21.22 21.27	053 039 357 315	1.0 1.1 2.9 2.1	2873 2932 2917	3004 3005 3005 2950 2950 2450 			300	winch stop A/C for W/P 35 pinger on bottom trace lost 450 alt veer @20m/min 40m/min		
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DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1	066 066 066 066 066 066 066 066 066 066	11:30 11:40 11:43 11:45 11:46 12:00 12:10 12:13 12:15 12:18 12:23 12:30 12:35 12:40 12:41 12:45 12:51	4 4 4 4 4 4 4 4 4 4 4	49.09 48.90 48.68 48.68 48.32 48.10 48.10 48.04 47.99 47.99 47.96 47.93	12 12 12 12 12 12 12 12 12 12 12	21.60 21.39 21.22 21.27 22.00 25.55 22.97 23.17 23.40	053 039 357 315 200 280 280 272 285 274	1.0 1.1 2.9 2.1 2.0 2.0 2.0 2.0 2.0 2.3 2.3	2873 2932 2917 2873 3025	3004 3005 2950 2950 2450 3553 3707 4000 4070 4070 4137			250 175 150	winch stop A/C for W/P 35 pinger on bottom trace lost 450 alt veer @20m/min 40m/min 50m/min turning simrad em12 on stopping winch down at 20m/min		
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DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1	066 066	11:30 11:40 11:43 11:45 11:46 12:00 12:10 12:13 12:15 12:18 12:35 12:35 12:35 12:35 12:40 12:41 12:45 12:51 12:55 13:05 13:15	4 4 4 4 4 4 4 4 4 4 4 4	49.09 48.90 48.68 48.32 48.10 48.04 47.99 47.96 47.93 47.92 47.90	12 12 12 12 12 12 12 12 12 12 12 12 12 1	21.60 21.39 21.22 21.27 22.00 25.55 22.97 23.17 23.40 23.55 24.00	053 039 357 315 200 280 272 285 274 273 291	1.0 1.1 2.9 2.1 2.0 2.0 2.0 2.0 2.3 2.6 3.2 2.0 2.4	2873 2932 2917 2873 3025 4085	3004 3005 2950 2950 2450 2450 3553 3707 4000 4070 4070 4071 4137 4150 5026			250 175 150 175 175	winch stop A/C for W/P 35 pinger on bottom trace lost 450 alt veer @20m/min 40m/min 50m/min turning simrad em12 on stopping winch down at 20m/min down at 38m/min down at 38m/min down at 38m/min stopped veering		
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DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1	0666 0666 0666 0666 0666 0666 0666 066	11:30 11:40 11:43 11:45 12:00 12:10 12:13 12:15 12:18 12:23 12:30 12:30 12:30 12:30 12:40 12:41 12:45 12:40 12:41 12:55 13:05 13:15 13:20 13:21 13:25	4 4 4 4 4 4 4 4 4 4 4 4	49.09 48.90 48.68 48.32 48.10 48.04 47.99 47.96 47.93 47.92 47.90	12 12 12 12 12 12 12 12 12 12 12 12 12 1	21.60 21.39 21.22 21.27 22.00 25.55 22.97 23.17 23.40 23.55 24.00	053 039 357 315 200 280 272 285 274 273 291	1.0 1.1 2.9 2.1 2.0 2.0 2.0 2.0 2.3 2.6 3.2 2.0 2.4	2873 2932 2917 2873 3025 4085	3004 3005 2950 2950 2450 3553 3707 4000 4070 4070 4137 4150 4137 4150 5026 5026			250 175 150 175 175 175 200	winch stop A/C for W/P 35 pinger on bottom trace lost 450 alt veer @20m/min 40m/min 50m/min turning simrad em12 on stopping winch down at 20m/min down at 38m/min down at 38m/min down at 38m/min stopped veering		
DUM1	0666 0666 0666 0666 0666 0666 0666 066	11:30 11:40 11:43 11:45 11:45 11:46 12:00 12:13 12:15 12:13 12:15 12:13 12:35 12:40 12:45 12:40 12:45 12:51 12:55 13:15 13:20 13:21 13:20 13:21 13:25	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	49.09 48.90 48.68 48.32 48.10 48.04 47.99 47.96 47.93 47.92 47.90 47.88 47.84	12 12 12 12 12 12 12 12 12 12 12 12 12 1	21.60 21.39 21.22 21.27 22.00 25.55 22.97 23.17 23.40 23.55 24.00 24.39 24.89	053 039 357 315 200 280 280 272 285 274 273 291 274 274 274	1.0 1.1 2.9 2.1 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.3 2.0 2.0 2.3 3.2 2.0 2.4 3.4 3.4	2873 2932 2917 2873 3025 4085	3004 3005 3005 2950 2950 2450 3553 3707 4000 4070 4070 4071 4150 4561 5026 5026 5026			250 175 150 175 175 175 175 200 300	winch stop A/C for W/P 35 pinger on bottom trace lost 450 alt veer @20m/min 40m/min 50m/min turning simrad em12 on stopping winch down at 20m/min down at 38m/min down at 38m/min stopped veering Increased ship's speed 1/4 knot bottom should be rising up soon		
DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1	0666 0666 0666 0666	11:30 11:40 11:43 11:45 11:45 11:46 12:00 12:10 12:10 12:13 12:15 12:18 12:23 12:30 12:30 12:35 12:40 12:41 12:55 13:05 13:20 13:21 13:25 13:20 13:21 13:25	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	49.09 48.90 48.68 48.32 48.10 48.04 47.99 47.96 47.93 47.92 47.90 47.88	12 12 12 12 12 12 12 12 12 12 12 12 12 1	21.60 21.39 21.22 21.27 22.00 25.55 22.97 23.17 23.40 23.55 24.00 24.39	053 039 357 315 200 280 272 285 274 273 291 274	1.0 1.1 2.9 2.1 2.0 2.0 2.3 2.6 3.2 2.0 2.4 3.4	2873 2932 2917 2873 3025 4085	3004 3005 2950 2950 2450 3553 3707 4000 4070 4070 4137 4150 4137 4150 5026 5026			250 175 150 175 175 175 200	winch stop A/C for W/P 35 pinger on bottom trace lost 450 alt veer @20m/min 40m/min 50m/min turning simrad em12 on stopping winch down at 20m/min down at 20m/min down at 38m/min down at 38m/min down at 38m/min stopped veering Increased ship's speed 1/4 knot bottom should be rising up soon decreasing to 1.5 knots (down 1/4 knot)		
DUM1	0666 0666 0666 0666	11:30 11:40 11:43 11:45 11:46 12:00 12:13 12:15 12:18 12:30 12:32 12:30 12:32 12:30 12:32 12:40 12:41 12:45 13:26 13:20 13:21 13:22 13:35 13:32	4 4 4 4 4 4 4 4 4 4 4 4 4	49.09 48.90 48.68 48.68 48.32 48.10 48.04 47.99 47.99 47.99 47.92 47.90 47.88 47.80	12 12 12 12 12 12 12 12 12 12 12 12 12 1	21.60 21.39 21.22 21.27 22.00 25.55 22.97 23.17 23.40 23.55 24.00 24.39 24.89 25.40	053 039 357 315 200 280 280 282 285 274 273 291 274 291 291 291	1.0 1.1 2.9 2.1 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 3.2 2.0 3.2 3.2 3.4 3.4 3.1 3.0	2873 2932 2917 2873 3025 4085 4091	3004 3005 2950 2950 2450 3553 3707 4000 4070 4070 4070 4137 4150 4137 4150 5026 5026 5026 5026			250 175 150 175 175 175 175 200 300	winch stop A/C for W/P 35 pinger on bottom trace lost 450 alt veer @20m/min 40m/min 50m/min 50m/min turning simrad em12 on stopping winch down at 20m/min down at 40m/min down at 38m/min stopped veering Increased ship's speed 1/4 knot bottom should be rising up soon decreasing to 1.5 knots (down 1/4 knot) 10m/min up then 30m/min up		
DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1	0666 0666 0666 0666	11:30 11:40 11:43 11:45 11:45 11:46 12:00 12:10 12:10 12:13 12:15 12:18 12:23 12:30 12:30 12:35 12:40 12:41 12:55 13:05 13:20 13:21 13:25 13:20 13:21 13:25	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	49.09 48.90 48.68 48.32 48.10 48.04 47.99 47.96 47.93 47.92 47.90 47.88 47.84	12 12 12 12 12 12 12 12 12 12 12 12 12 1	21.60 21.39 21.22 21.27 22.00 25.55 22.97 23.17 23.40 23.55 24.00 24.39 24.89	053 039 357 315 200 280 280 272 285 274 273 291 274 274 274	1.0 1.1 2.9 2.1 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.3 2.0 2.0 2.3 3.2 2.0 2.4 3.4 3.4	2873 2932 2917 2873 3025 4085	3004 3005 3005 2950 2950 2450 3553 3707 4000 4070 4070 4071 4150 4561 5026 5026 5026			250 175 150 175 175 175 175 200 300	winch stop A/C for W/P 35 pinger on bottom trace lost 450 alt veer @20m/min 40m/min 50m/min turning simrad em12 on stopping winch down at 20m/min down at 20m/min down at 38m/min down at 38m/min down at 38m/min stopped veering Increased ship's speed 1/4 knot bottom should be rising up soon decreasing to 1.5 knots (down 1/4 knot)		
DUM1	0666 0666 0666 0666 0666 0666 0666 066	11:30 11:40 11:43 11:45 11:46 12:00 12:13 12:16 12:13 12:14 12:23 12:30 12:35 12:30 12:35 13:20 13:21 13:25 13:20 13:21 13:25 13:20 13:21 13:25 13:30 13:25 13:30	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	49.09 48.90 48.68 48.68 48.32 48.10 48.10 47.99 47.99 47.93 47.92 47.93 47.92 47.93 47.92 47.93 47.92 47.84 47.84 47.84	12 12 12 12 12 12 12 12 12 12 12 12 12 1	21.60 21.39 21.22 21.27 22.00 25.55 22.97 23.17 23.40 23.55 24.00 24.39 24.89 25.40	053 039 357 315 200 280 280 288 272 285 274 273 291 274 274 274 274 275	1.0 1.1 2.9 2.1 2.0 2.0 2.0 2.3 2.0 2.4 3.4 3.1 3.0 2.4	2873 2932 2917 2873 3025 4085 4091	3004 3005 3005 2950 2950 2450 3553 3707 4000 4070 4070 4070 4071 4135 4561 5026 5026 5026 5026 5026			250 175 150 175 175 175 175 200 300	winch stop A/C for W/P 35 pinger on bottom trace lost 450 alt veer @20m/min 40m/min 50m/min 50m/min turning simrad em12 on stopping winch down at 20m/min down at 20m/min down at 38m/min down at 38m/min stopped veering Increased ship's speed 1/4 knot bottom should be rising up soon decreasing to 1.5 knots (down 1/4 knot) 10m/min up then 30m/min up starting turn at 6 degrees per minute- end of line		
DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1	0666 0666 0666 0666 0666 0666 0666 066	11:30 11:40 11:43 11:45 11:46 12:00 12:13 12:15 12:13 12:13 12:13 12:13 12:13 12:13 12:13 12:13 12:30 12:30 12:41 12:55 13:15 13:20 13:21 13:25 13:30 13:36 13:45	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	49.09 48.08 48.68 48.32 48.10 47.99 47.99 47.93 47.92 47.92 47.93 47.92 47.92 47.92 47.92 47.72	12 12 12 12 12 12 12 12 12 12 12 12 12 1	21.60 21.39 21.22 21.22 21.27 22.00 25.55 22.97 23.40 23.55 22.97 23.40 24.00 24.39 24.00 24.39 25.40 24.55	053 039 357 315 200 280 280 280 272 273 291 274 273 291 274 273 290 275 275	1.0 1.1 2.9 2.1 2.0 2.0 2.0 2.3 2.0 2.0 2.3 2.0 2.4 3.4 3.0 3.0 2.4 2.4 2.4	2873 2932 2917 2873 3025 4085 4091	3004 3005 3005 2950 2950 2450 3553 3707 4000 4070 4071 4137 4150 4561 5026 5026 5026 5026 5026			250 175 150 175 175 175 200 300 300 ?	winch stop A/C for W/P 35 pinger on bottom trace lost 450 alt veer @20m/min 40m/min 50m/min turning simrad em12 on stopping winch down at 20m/min down at 20m/min down at 38m/min down at 38m/min down at 38m/min down at 38m/min down at 38m/min down at 38m/min down at 38m/min stopped veering Increased ship's speed 1/4 knot bottom should be rising up soon decreasing to 1.5 knots (down 1/4 knot) 10m/min up then 30m/min up starting turn at 6 degrees per minute- end of line turning and veering in at 30m/min		
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DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1	0666 0666 0666 0666	11:30 11:43 11:43 11:43 11:45 11:46 12:00 12:10 12:10 12:10 12:10 12:12 12:15 12:18 12:30 12:30 12:30 12:30 12:31 12:41 12:45 13:30 13:45 13:30 13:32 13:32 13:35 13:45 13:45 13:45 13:45 13:45 14:00	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	49.09 48.90 48.68 48.68 48.32 48.10 47.99 47.99 47.90 47.93 47.92 47.90 47.93 47.90 47.93 47.90 47.93 47.90 47.93 47.90 47.93 47.94 47.93 47.94 47.94 47.94 47.72 47.72 47.72 47.72 47.72	12 12 12 12 12 12 12 12 12 12 12 12 12 1	21.60 21.39 21.22 21.22 21.27 22.00 25.55 22.97 23.17 23.40 24.00 24.39 24.00 24.39 25.40 25.84 25.86 26.44 26.79	053 039 357 315 200 280 272 285 274 273 274 273 274 274 275 290 267 275 313	1.0 1.1 2.9 2.1 2.0 2.0 2.3 2.0 2.4 3.4 3.1 3.0 2.4 2.6	2873 2932 2917 2873 3025 4085 4091	3004 3005 3005 2950 2950 2450 3553 3707 4000 4070 4070 4070 4070 4070 407			250 175 150 175 175 175 200 300 300 300 ? ?	winch stop A/C for W/P 35 pinger on bottom trace lost 450 alt veer @20m/min 40m/min 50m/min turning simrad em12 on stopping winch down at 20m/min down at 38m/min down at 38m/min stopped veering Increased ship's speet 1/4 knot bottom should be rising up soon decreasing to 1.5 knots (down 1/4 knot) 10m/min up then 30m/min up starting turn at 6 degrees per minute- end of line turning and veering in at 30m/min 40m/min up wire compromising block- 40m/min up and turning		
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DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1 DUM1	0666 0666 0666 0666	11:30 11:40 11:43 11:45 11:46 12:00 12:10 12:13 12:15 12:18 12:23 12:30 12:32 12:30 12:32 12:30 12:32 12:30 12:32 12:30 12:32 13:35 13:320 13:25 13:320 13:25 13:320 13:25 13:320 13:25 13:320 13:25 13:320 13:25 13:325 13:420 14:400 14:400 14:400 14:420	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	49.09 48.90 48.68 48.68 48.32 48.10 47.99 47.99 47.90 47.93 47.92 47.90 47.93 47.90 47.93 47.90 47.93 47.90 47.93 47.90 47.93 47.94 47.93 47.94 47.94 47.94 47.72 47.72 47.72 47.72 47.72	12 12 12 12 12 12 12 12 12 12 12 12 12 1	21.60 21.39 21.22 21.22 21.27 22.00 25.55 22.97 23.17 23.40 24.00 24.39 24.00 24.39 25.40 25.84 25.86 26.44 26.79	053 039 357 315 200 280 280 272 274 273 291 274 273 291 274 275 275 313 330	1.0 1.1 2.9 2.1 2.0 2.0 2.0 2.0 2.0 2.0 2.3 3.2 2.0 2.4 3.4 3.1 3.0 2.4 2.4 2.4 2.4 2.4 3.9	2873 2932 2917 2873 3025 4085 4091	3004 3005 3005 2950 2950 2450 3553 3707 4000 4070 4070 4070 4070 4070 407			250 175 150 175 175 175 200 300 300 300 ? ?	winch stop A/C for W/P 35 pinger on bottom trace lost 450 alt veer @20m/min 40m/min 50m/min turning simrad em12 on stopping winch down at 20m/min down at 38m/min down at 38m/min stopped veering Increased ship's speet 1/4 knot bottom should be rising up soon decreasing to 1.5 knots (down 1/4 knot) 10m/min up then 30m/min up starting turn at 6 degrees per minute- end of line turning and veering in at 30m/min 40m/min up wire compromising block- 40m/min up and turning		

DUM1	066	15:15	4	44.80	12	28.10	336	1.6		1653				40m/min up- will come to 1000m w/o	1	
DUM1	066	15:50	4	44.80	12	29.03	298	4.1		1500				turning for WP40 to start next DUM line		
DUM1	066	16:00	4	43.24	12	29.77	268	3.6		1500				turning for WP40 to start next DUM line		
DUM1	066	16:17	4	43.70	12	30.70	200	4.1	3654	1500				turning for WP40 to start next DUM line		
DUM1	066	16:30	4	44.34	12	31.05	194	3.0	2900	1500						
DUM1	066	16:48	4	44.89	12	30.82	113	2.0	2872	1500				haul at 35m/min		
DUM1	066	16:56	4	44.69	12	30.62	107	2.0	2012	1254				stopped winch		
DUM1		17:00	4	45.02		30.59		2.2	2857	1254				stopped winch		
DUM1	066 066	17:00	4	45.05	12	30.40	122 098	2.0	2007	1204				0/c		
DUM1	066	17:05					090							switch simrad off line 58		
DUM1	066	17:30	4	45.17	12	29.59	095	1.6	2841	1254				switch similad on line 56		
								1.8								
DUM1	066	18:00	4	45.25	12	28.73	097		2575	1254						
DUM1 DUM1	066	18:15	4	45.32 45.36	12	28.28	108	1.6 2.5	2875	1254 1254				Qirrand hash, an line 50		
DUM1	066 066	18:25 18:30	4	45.38	12 12	28.00 27.86	094 084	2.5	2975	1254				Simrad back on line 59		
DUM1	066	18:45	4	45.45	12	27.43	107	1.4	2975	1254						
DUM1	066	18:58	4	45.52	12	27.43	210	0.5	2893	1254				akin analad dranned to aquina line to dran		
DUM1	066		4	45.52	12	27.07	109	0.5	2893	1254				ship speed dropped to cause line to drop Veer at 40m/min		
DOIVIT					12	27.07	109	0.5	2092	1254				veer at 40m/mm		
	CDT		2: sciend Lat. (So		Long ((West)				BRIDGET	oto				├ ────	
Operation	Iday		Deg	Min	Long. (Deg	Min	CMG	SMG	Nat dor!	Wire Out		Layback	Altitude	Comments	<u>├</u>	
DUM1	066	19:15	4	45.58	12	26.90	167	1.3	2892	1855	Depth	LayDack	Annue	Commento	┦────┤	
DUM1 DUM1	066	19:15	4	45.61	12	26.90	107	1.3	2892	2455					+	
DUM1	066	19:30	4	45.60	12	26.72	101	1.2	2877	2455 2834				Winch stopped. Ahead at 1.5SMG		
DUM1 DUM1	066	19:45	4	40.00	12	20.50	101	1.1	2001	2034				Veer at 20m/min		
DUM1	066	19:52	4											Stopped winch		
DUM1	066	20:00	4	45.68	12	26.15	069	1.4	2875	2915				Stopped witten		
DUM1 DUM1	066	20:00	4	40.00	12	20.15	009	1.4	20/3	2915				Veering at 20 m/min	+	
DUM1	066	20:00								2913				Stopped winch		
DUM1			4	45.70	12	25.82	099	1.0	2853	2962				Stopped which		
DUM1	066	20:13	4	45.70	12	20.02	099	1.0	2000	2903				Veer 20m/m		
DUM1	066	20:13								3032				Winch stop		
DUM1	066	20:22	4	45.71	12	25.51	068	1.1		3032				Veer 20m/m		
DUM1	066	20:30	-	45.71	12	20.01	000	1.1		3100				stopped		
DUM1	066	20:34	4	45.75	12	25.18	074	1.1		3010				stopped		
DUM1	066	20:51	-	40.70	12	20.10	014			3010				veering 20m/m		
DUM1	066									3124				winch stopped		
DUM1		21:00	4	45.81	12	24.85	100	1.6	3029	3125				veering 20m/m		
DUM1	066									3279				winch stopped		
DUM1	066	21:15	4	45.85	12	24.51	093	2.4	3033	3279						
DUM1	066	21:30	4	45.91	12	24.16	098	1.5	3136	3280						
DUM1	066	21:45	4	45.95	12	23.78	118	1.6	3134	3281						
DUM1	066	22:00	4	45.99	12	23.42	094	2.4	3157	3281						
DUM1	066	22:15	4	46.07	12	23.08	096	2.6	3196	3282						
DUM1	066	22:30	4	46.13	12	22.71	094	2.4	3135	3282				veer 20m/m		
DUM1	066	22:45	4	46.19	12	22.37	094	2.6	3174	3563				stop winch		
DUM1	066	23:00	4	46.24	12	22.00	092	2.4	3197	3563						
DUM1	066	23:15	4	46.26	12	21.64	093	2.5	3118	3564						
DUM1	066		4	46.28	12	21.27	095	2.6	3404	3565				A/C for W/P 38		
DUM1	066		4	46.42	12	20.02	120	2.2	3305	3565			_			
DUM1	067	00:05	4	46.90	12	20.81	161	1.9	3576	3566			_	turning for wp38		
DUM1	067	00:15	4	47.21	12	21.01	185	1.7	3573	3566			220?	turning for wp38		
DUM1	067	00:30	4	47.55	12	21.58	229	1.7	4765	3567			225?	start of 3rd line; pinger trace bad		
DUM1	067	00:45	4	47.61	12	22.16	268	2.0	4624	3567			175?	pinger trace bad		
DUM1	067	01:00	4	47.54	12	22.75	294	2.0	4497	3567			150?	pinger trace bad; turned off bow thruster		
DUM1	067	01:10	4	47.39	12	23.25	299	2.4		3755			1100	paying out at 30m/min		
DUM1	067	01:20	4	47.30	12	23.61	292	2.0		3755			300-1100			
DUM1	067	01:30	4	47.20	12	23.94	296	1.1		3755			700	slowing the ship to close to a stop, wire too high		
DUM1	067	01:45	4	47.12	12	24.20	299	0.8		3764			600	trace is back- lowering at 30m/min		
DUM1	067	01:55	4	47.06	12	24.40		0.8	2949	4150			150	good trace		
DUM1	067	02:15	4	46.93	12	24.70	289	0.9	2930	4011			120	hauling in at 20m/min		
DUM1	067	02:30	4	46.80	12	24.92	288	1.0		3916				hauling in at 10m/min		
DUM1	067	02:45	4	46.66	12	25.23	284	0.9		3735			190	stopped hauling in		
DUM1	067	03:00	4	46.54	12	25.53	282	1.0		3727			150			
DUM1	067	03:15	4	46.40	12	25.86	284	0.9		3638			100			
DUM1	067	03:25	4	46.32	12	26.05	281	1.1		3632	l			Hauling in for recovery at 40m/min	ļ	
DUM1	067	04:00	4	46.04	12	27.08	281	2.4		2232				Hauling in for recovery at 40m/min		
DUM1	067	04:15	4	45.07	12	27.92	280	2.7		1626				l		

DUM1	067	04:30	4	45.72	12	28.71	282	2.7	1	1106					1
DUM1	067	04:55	4	43.72	12	20.71	202	2.1		1100				Manoever ship for MAPR recovery	
DUM1	067	04.55								330				MAPR inboard (308 m ref. Wire out)	
DUM1	067	05:22								270				MAPR inboard (358 m ref. Wire out)	
DUM1	067	05:22								210					
										170				MAPR inboard (208 m ref. Wire out)	
DUM1	067	05:33												MAPR inboard (158 m ref. Wire out)	
DUM1		05:38								120				MAPR inboard (108 m ref. Wire out)	
DUM1		05:43								69				MAPR inboard (58 m ref. Wire out)	
-	CD1	69 Leg2	: sciend												
			Lat. (So		Long. (BRIDGET					
Operation			Deg	Min	Deg	Min	CMG	SMG	Nat. dept		Depth	Layback	Altitude	Comments	
DUM1	067	05:46								61				MAPR inboard (50 m ref. Wire out)	
DUM1	067	05:55													
transit	067	06:04	4	46.87	12	30.74	152	1.1	2778					In transit to RC07	
transit	067	06:15												USBL pod retracted, transit to station RC07	
transit	067	06:30	4	47.13	12	29.73	087	9.2	2652						
transit	067	07:00	4	41.86	12	25.31	085	10.7	2854						
RC7	067	07:29	4	46.78	12	23.37	113	1.1	3070					Onstation RC07	
RC7	067	07:34	4	46.80	12	23.38								RC07 in water	
RC7	067	07:38	4	46.85	12	23.40			3070	50				MAPR in water	
RC7	067	07:52												Stopwinch recover RC and reposition	
RC7	067	08:00	4	47.15	12	23.40									
RC7	067	08:13	4	47.04	12	23.43			3029					MAPR out of water	
RC7	067	08:16	4	47.05	12	23.42								RC07 on deck	
transit	067	08:17												Reposition to RC07	
RC7	067	08:37	4	46.63	12	23.20			3055					Onstation RC07 - In water	
RC7	067	08:40	4	46.64	12	23.20			3055					MAPR in water	
RC7	067	09:00	4	46.76	12	23.23			3058	1410				paying out at 74 m/min	
RC7	067	09:15	4	46.82	12	23.24			3069	2390					
RC7	067	09:24	4	46.84	12	23.24			3129	3141				chipper on bottom	
RC7	067	09:27							3045	3148				chipper on bottom again - recovering	
RC7	067	09:35												chipper possibly lodged	
RC7	067	09:40												problems with winch	
RC7	067	10:00	4	46.93	12	23.33				3082				still problems with winch	
RC7	067	10:30	4	46.99	12	23.38				3082				winch brake problems	
RC7	067	10:35												winch repaired	
RC7	067	11:00	4	46.98	12	23.44				1155				recovering chipper	
RC7	067	11:16												MAPR on deck	
RC7	067	11:19												chipper on deck	
RC7	067	11:30	4	46.97	12	23.29	045	3.8	3129					Transit to RC08	
RC8	067	11:33	4	46.03	12	22.51	0.0	0.0	0120					onRC08 station	
RC8	067	12:02	4	46.06	12	22.55	264	0.4						RC08 in water	
RC8	067	12:02	4	46.11	12	22.55	165	0.1						mapr on wire at 20m	
RC8	067	12:35	4	46.24	12	22.55	122	0.9	3125	1760				down at 67m/min	
RC8	067	12:35	4	46.22	12	22.55	122	1.1	3123	2888				70m/min	
RC8	067	12:45	4	46.24	12	22.60	133	1.1	3143	3231				Hit on bottom tension 50 to32	
RC8	067	13:02	4	46.24	12	22.62	063	0.5	3143	3231				2nd hit on bottom tension 50 to 32	
RC8	067	13:30	4	40.27	12	22.62	124	1.5	3102	1766				60m/min	
RC8	067	13:45	4	46.27	12	22.62	124	1.2	3102	838				60m/min	
RC8	067	14:00	4	46.27	12	22.60	239	0.9	3108	030				mapr off and rc8 on deck	
transit	067	14:14	4	46.25	12	22.60	142	9.1	3002	0				transit to ABE launch site	
transit	067	14:30	4	48.46	12	21.26	142	2.6	2884					transit to ABE150 launch site	
transit	067	14:45	4	48.49	12	21.20	129	1.1	2883					on station; stem down	
CTD3	067	14:45	4	48.49	12	21.16	126	1.1	2883						
Test3	067	15:00	4	48.50	12	21.15	223	0.5	2883					CTD test with mapr- set up CTD in water	
Test3	067	15:14	4	48.53	12	21.14	223	1.0	2000					CTD In water CTDat 500m	
Test3	067	15:25	4	40.01	12	21.17	200	1.0						on deck	
resta	100	15:42												UII UEUN	
ADE CI	007	40.00		40.50	40	04.40	000		0070					an atation ADE 04. Dealerment and	
ABE-01	067	16:20	4	48.50	12	21.10	289	1.1	2879					on station ABE-01. Deployment prep.	
ABE-01	067	16:25												Start ABE-01 launch	
ABE-01	067	16:32												weight in water	
ABE-01	067	16:34	,	40.11	40	04.17	0000	0 7	0070					ABE in water	
ABE-01	067	16:35	4	48.41	12	21.17	090	0.7	2879					Release pin out. ABE on descent	
ABE-01	067	17:00	4	48.43	12	21.20	097	1.1							
ABE-01	067	17:30	4	48.43	12	21.21	216	0.2	2880					ABE descending	
ABE-01	067	18:00	4	48.87	12	21.25	007	0.4	2934					transit to ctd station 06	
	CD1		: sciend												
			Lat. (So	uth)	Long. ((West)				BRIDGET	etc				

Operation	.Idav	Time	Deg	Min	Deg	Min	CMG	SMG	Nat. denti	Wire Out	Depth	Layback	Altitude	Comments	1	
CTD06	067	18:30	4	49.43	12	21.89	166	0.4	2923	in o out	Doptii	Lujiouon	/ lititudo	on station ctd 06		
CTD06	067	18:43	4	49.50	12	21.87	181	0.9	2973					CTD06 inn water		
CTD06	067	19:12	4	49.74	12	21.82		0.0	2962		1200			V4 (OBS) dead		
CTD06	067	19:45								2880	2890			Bottles 1&2 fired Nephs 0.040		
CTD06	067	19:49								2840	2845			Bottles 3&4 fired Nephs 0.039		
CTD06	067	19:53								2800	2804			Bottles 5&6 fired Nephs 0.042		
CTD06	067	19:58								2760	2766			Bottles 7&8 fired Nephs >0.051		
CTD06	067	20:00								2750	2759			Bottles 9&10 fired Nephs >0.06		
CTD06	067	20:03								2740	2749			Bottles 11&12 fired Nephs 0.049		
CTD06	067	20:08								2720	2730			Bottles 13&14 fired Nephs 0.049		
CTD06	067	20:14								2680	2692			Bottles 15&16 fired Nephs 0.040		
CTD06	067	20:18								2640	2653			Bottles 17&18 fired Nephs 0.039		
CTD06	067	20:24								2500	2512			Bottles 19&20 fired Nephs 0.039		
CTD06	067	20:39								1988	2000			Bottles 21&22 fired Nephs 0.038		
CTD06	067	21:20								5	10			Bottles 23&24 fired Nephs 0.078		
CTD06	067	21:25	4	49.91	12	21.57			2977					CTD06 on deck		
CTD07	067	23:15	4	46.98	12	23.64			3079					CTD 06 in water		
CTD07	068	00:16	4	46.95	12	23.55			3049					CTD on bottom		
CTD07	068	00:17								2980	2995			fire bottles 1 & 2, neph 46mv		
CTD07	068	00:20								2960	2975			fire bottles 3+4, neph 50mv		
CTD07	068	00:25								2910	2924			fire bottles 5+6, neph 55mv		
CTD07	068	00:28								2862	2875			fire bottles 7+8, neph 56mV		
CTD07	068	00:34								2810	2825			fire bottles 9+11, neph 60mV		
CTD07	068	00:37								2760	2775			fire bottles 13+15, neph 40mV		
CTD07	068	00:50								2487	2500			fire bottles 17+18, neph 40mV		
CTD07	068	01:02								1987	2000			fire bottles 19, 20, 21, 23, 24 neph 40mV		
CTD7	068	01:42	4	46.98	12	23.61			3049					CTD on deck		
transit	068	02:30	4	48.13	12	23.40	156	2.0	2930					transit to RC9		
RC9	068	03:00	4	48.04	12	22.95	258	0.3	2962	60				RC9 and mapr in water		
RC9	068	03:35	4	48.89	12	22.92	126	0.6	2959	2291				70m/min		
RC9	068	03:44	4	48.89	12	22.91	169	0.4	2959	3034				Hit bottom, then up 100m at 10m/min		
RC9	068	03:50	4	48.89	12	22.90	144	0.4	2960	3034				2nd Hit, recovering chipper		
RC9	068	04:40												Chipper inboard		
Transit	068	04:45												Start transit to RC10		
Transit	068	05:00	4	48.80	12	22.70	030	4.0	2984							
Transit	068	05:30	4	47.60	12	27.00	035	3.5	3021							
RC10	068	05:35												On station RC10. Start chipper deployment		
RC10	068	05:40												Chipper in water		
RC10	068	05:43	4	47.67	12	22.00			2999							
RC10	068	06:24												mAPR 13 on wire. Deployment at 70m/min		
RC10	068													Tension off wire (0.4 to 0.1, then back to 0.4)		
RC10	000	06:28												Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425)		
DOAC	068	06:33							3011	3086				Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out')		
RC10	068	06:33 06:37		47.70	42	00.01								Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425)		
RC10	068 068	06:33 06:37 07:00	4	47.70	12	22.04			3011 3005	3086 1851				Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out') 2nd hit bottom at 40 m/min. Recovering chipper		
	068	06:33 06:37	4	47.70	12	22.04								Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out')		
RC10 RC10	068 068 068	06:33 06:37 07:00 07:32					177	31	3005					Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out') 2nd hit bottom at 40 m/min. Recovering chipper		
RC10 RC10 RC11	068 068 068 068	06:33 06:37 07:00 07:32 08:00	4	48.60	12	22.10	177	3.1	3005 2939					Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out') 2nd hit bottom at 40 m/min. Recovering chipper		
RC10 RC10 RC11 RC11	068 068 068 068 068	06:33 06:37 07:00 07:32 08:00 08:30	4 4	48.60 50.45	12 12	22.10 22.17	177 166	3.1 4.2	3005					Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out) 2nd hit bottom at 40 m/min. Recovering chipper chipper on deck - in transit RC11		
RC10 RC10 RC11 RC11 RC11	068 068 068 068 068 068	06:33 06:37 07:00 07:32 08:00 08:30 08:43	4	48.60	12	22.10			3005 2939 3018	1851				Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out') 2nd hit bottom at 40 m/min. Recovering chipper chipper on deck - in transit RC11 on station RC11		
RC10 RC10 RC11 RC11 RC11 RC11 RC11	068 068 068 068 068 068 068	06:33 06:37 07:00 07:32 08:00 08:30 08:43 08:48	4 4	48.60 50.45	12 12	22.10 22.17			3005 2939 3018 3025	1851 				Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out') 2nd hit bottom at 40 m/min. Recovering chipper chipper on deck - in transit RC11 on station RC11 chipper in water		
RC10 RC10 RC11 RC11 RC11 RC11 RC11 RC11	068 068 068 068 068 068 068 068	06:33 06:37 07:00 07:32 08:00 08:30 08:43 08:48 08:51	4 4	48.60 50.45	12 12	22.10 22.17			3005 2939 3018	1851 0 20				Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out) 2nd hit bottom at 40 m/min. Recovering chipper chipper on deck - in transit RC11 on station RC11 chipper in water MAPR in water		
RC10 RC10 RC11 RC11 RC11 RC11 RC11	068 068 068 068 068 068 068 068 068	06:33 06:37 07:00 07:32 08:00 08:30 08:43 08:48 08:51 08:55	4 4 4	48.60 50.45 50.93	12 12	22.10 22.17			3005 2939 3018 3025	1851 				Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out') 2nd hit bottom at 40 m/min. Recovering chipper chipper on deck - in transit RC11 on station RC11 chipper in water		
RC10 RC10 RC11 RC11 RC11 RC11 RC11 RC11	068 068 068 068 068 068 068 068 068	06:33 06:37 07:00 07:32 08:00 08:30 08:43 08:43 08:48 08:51 08:55 69 Leg2	4 4 4 : science	48.60 50.45 50.93	12 12 12	22.10 22.17 22.25			3005 2939 3018 3025	0 20 504				Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out) 2nd hit bottom at 40 m/min. Recovering chipper chipper on deck - in transit RC11 on station RC11 chipper in water MAPR in water		
RC10 RC11 RC11 RC11 RC11 RC11 RC11 RC11	068 068 068 068 068 068 068 068 068 068	06:33 06:37 07:00 07:32 08:00 08:30 08:43 08:48 08:51 08:55 69 Leg2	4 4 4 : scienc Lat. (So	48.60 50.45 50.93 ee log uth)	12 12 12 12	22.10 22.17 22.25 (West)	166	4.2	3005 2939 3018 3025 3025	0 20 504		Lavback	Altitude	Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 1yuli-out) 2nd hit bottom at 40 m/min. Recovering chipper chipper on deck - in transit RC11 on station RC11 chipper in water MAPR in water spike on load monitor		
RC10 RC11 RC11 RC11 RC11 RC11 RC11 RC11	068 068 068 068 068 068 068 068 068 068	06:33 06:37 07:00 07:32 08:00 08:30 08:43 08:43 08:43 08:43 08:55 69 Leg2	4 4 4 : science	48.60 50.45 50.93	12 12 12	22.10 22.17 22.25		4.2	3005 2939 3018 3025 3025	1851 0 20 504 BRIDGET Wire Out		Layback	Altitude	Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out') 2nd hit bottom at 40 m/min. Recovering chipper chipper on deck - in transit RC11 on station RC11 chipper in water MAPR in water spike on load monitor Comments		
RC10 RC11 RC11 RC11 RC11 RC11 RC11 RC11	068 068 068 068 068 068 068 068 068 068	06:33 06:37 07:00 07:32 08:00 08:30 08:43 08:43 08:48 08:51 08:55 69 Leg2	4 4 4 : scienc Lat. (So	48.60 50.45 50.93 ee log uth)	12 12 12 12	22.10 22.17 22.25 (West)	166	4.2	3005 2939 3018 3025 3025	0 20 504 BRIDGE1 Wire Out 3155		Layback	Altitude	Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out') 2nd hit bottom at 40 m/min. Recovering chipper chipper on deck - in transit RC11 on station RC11 chipper in water MAPR in water Spike on load monitor Comments chipper on bottom		
RC10 RC11 RC11 RC11 RC11 RC11 RC11 RC11	068 068 068 068 068 068 068 068 068 068	06:33 06:37 07:00 07:32 08:00 08:30 08:43 08:54 08:55 69 Leg2 Time 09:40	4 4 4 : scienc Lat. (So	48.60 50.45 50.93 ee log uth)	12 12 12 12	22.10 22.17 22.25 (West)	166	4.2	3005 2939 3018 3025 3025	1851 0 20 504 BRIDGET Wire Out		Layback	Altitude	Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out) 2nd hit bottom at 40 m/min. Recovering chipper chipper on deck - in transit RC11 on station RC11 chipper in water MAPR in water spike on load monitor Comments Chipper on bottom wire under tension		
RC10 RC11 RC11 RC11 RC11 RC11 RC11 RC11	068 068 068 068 068 068 068 068 068 CD1 Jday 068 068	06:33 06:37 07:00 07:32 08:00 08:30 08:43 08:43 08:43 08:55 08:55 69 Leg2 7 Time 09:40 09:43	4 4 4 : scienc Lat. (So	48.60 50.45 50.93 ee log uth)	12 12 12 12	22.10 22.17 22.25 (West)	166	4.2	3005 2939 3018 3025 3025	1851 0 20 504 BRIDGET Wire Out 3155		Layback	Altitude	Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out') 2nd hit bottom at 40 m/min. Recovering chipper chipper on deck - in transit RC11 on station RC11 chipper in water MAPR in water Spike on load monitor Comments chipper on bottom		
RC10 RC11 RC11 RC11 RC11 RC11 RC11 Operation RC11 RC11 RC11	068 068 068 068 068 068 068 068 068 CD1 Jday 068 068 068	06:33 06:37 07:00 07:32 08:00 08:30 08:43 08:43 08:43 08:43 08:43 08:55 69 Leg2 Time 09:40 09:43 09:44	4 4 : scienc Lat. (So Deg	48.60 50.45 50.93 ee log uth) Min	12 12 12 Long. (Deg	22.10 22.17 22.25 West) Min	166	4.2	3005 2939 3018 3025 3025 Wat. dept	1851 0 20 504 BRIDGET Wire Out 3155		Layback	Altitude	Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out) 2nd hit bottom at 40 m/min. Recovering chipper chipper on deck - in transit RC11 on station RC11 chipper in water MAPR in water spike on load monitor Comments Chipper on bottom wire under tension		
RC10 RC11 RC11 RC11 RC11 RC11 RC11 RC11	068 068 068 068 068 068 068 068 068 068	06:33 06:37 07:00 07:32 08:00 08:30 08:43 08:43 08:43 08:43 08:43 08:55 69 Leg2 Time 09:40 09:43 09:44 10:00	4 4 2 2 3 2 3 4	48.60 50.45 50.93 ee log uth) Min 51.02	12 12 12 Long. (Deg	22.10 22.17 22.25 West) Min 22.16	166	4.2	3005 2939 3018 3025 3025 Nat. depti 3031	0 20 504 BRIDGET Wire Out 3155 3155		Layback	Altitude	Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out) 2nd hit bottom at 40 m/min. Recovering chipper chipper on deck - in transit RC11 on station RC11 chipper in water MAPR in water spike on load monitor Comments Chipper on bottom wire under tension		
RC10 RC11 RC11 RC11 RC11 RC11 RC11 RC11	068 068 068 068 068 068 068 068 068 068	06:33 06:37 07:00 07:32 08:00 08:30 08:43 08:43 08:43 08:55 09:44 08:55 69 Leg2 Time 09:40 09:44 09:44 10:00 10:30	4 4 2 2 3 2 3 4	48.60 50.45 50.93 ee log uth) Min 51.02	12 12 12 Long. (Deg	22.10 22.17 22.25 West) Min 22.16	166	4.2	3005 2939 3018 3025 3025 Nat. depti 3031	0 20 504 BRIDGET Wire Out 3155 3155 3155 535		Layback	Altitude	Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out) 2nd hit bottom at 40 m/min. Recovering chipper chipper on deck - in transit RC11 on station RC11 chipper in water MAPR in water spike on load monitor Comments Chipper on bottom wire under tension on bottom again - recovering		
RC10 RC11 RC11	068 068 068 068 068 068 068 068 068 068	06:33 06:37 07:00 07:32 08:00 08:43 08:48 08:51 08:55 69 Leg2 09:40 09:43 09:44 10:00 10:30 10:39 10:45	4 4 4 : scienc Lat. (So Deg	48.60 50.45 50.93 :e log uth) Min 51.02 51.10	12 12 12 Long. (Deg 12 12	22.10 22.17 22.25 West) Min 22.16 22.16	166 CMG	4.2	3005 2939 3018 3025 3025 Nat. dept 3031 3039	1851 0 20 504 BRIDGET Wire Out 3155 3155 3155 3155 19		Layback	Altitude	Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out) 2nd hit bottom at 40 m/min. Recovering chipper chipper on deck - in transit RC11 on station RC11 chipper in water MAPR in water spike on load monitor Comments chipper on bottom wire under tension on bottom again - recovering MAPR on deck		
RC10 RC11 RC11 RC11 RC11 RC11 RC11 RC11	068 068 068 068 068 068 068 068 068 068	06:33 06:37 07:00 07:32 08:00 08:30 08:43 08:43 08:43 08:55 69 Leg2 69 Leg2 69 Leg2 09:40 09:43 09:44 10:00 10:30 10:39	4 4 2 2 3 2 3 4	48.60 50.45 50.93 ee log uth) Min 51.02	12 12 12 Long. (Deg	22.10 22.17 22.25 West) Min 22.16	166	4.2	3005 2939 3018 3025 3025 Nat. depti 3031	1851 0 20 504 BRIDGET Wire Out 3155 3155 3155 3155 19		Layback	Altitude	Tension off wire (0.4 to 0.1, then back to 0.4) Tension off wire (0.425 to 0.125, then back to 0.425) 1st hit bottom at 70 m/min(wire reading at 'pull-out) 2nd hit bottom at 40 m/min. Recovering chipper chipper on deck - in transit RC11 on station RC11 chipper in water MAPR in water spike on load monitor Comments chipper on bottom wire under tension on bottom again - recovering MAPR on deck		

	068	11:30	4	48.70	12	21.88	003	2.9	2907						T T	
transit	000	11.50	4	40.70	12	21.00	005	2.3	2301							
CTD08	068	11:36	4	48.60	12	21.82			2910					On station CTD08		
CTD08	068		4	40.00	12	21.02			2898	0				CTD in water		
CTD08	068		4	48.64	12	21.77	256	0.1	4074	1025				60m/min		
							200	0.1		1025						
CTD08	068		4	48.65	12	21.81			2893	0050				CTD on bottom		
CTD08	068									2852				fire 1+2		
CTD08	068								2811	2825				fire 3 + 4 No neph so use trans 90.01		
CTD08	068								2786	2800				fire 5 + 6 89.988		
CTD08	068								2761	2775				fire 7 + 8 trans 89.988		
CTD08	068								2751	2765				fire 9+10, trans 89.988		
CTD08	068								2736	2750				fire 11+ 12, trans 89.963		
CTD08		13:13							2711	2725				fire 13 + 14, trans 89.939		
CTD08	068								2626	2700				fire 15 + 16, trans 90.012		
CTD08		13:32							2000	2010				fire 17 + 22		
CTD08	068	14:11	4	48.52	12	21.85			2923					CTD on deck		
CTD08	068															
CTD08	068	14:45												finish ctd sampling ,hydrowire fix		
	068															
DEAD	068	15:00												hydrowire operations		
						l										
CTD09	068	19:25												resume science	1	
CTD09	068														1	
CTD09	068	19:31	4	47.63	12	22.08	1	1	2998					CTD in water	+ +	
CTD09	068		· ·						2000					stop winch to test things	+ +	
CTD09	068													winch going again	+ +	
CTD09	068		4	47.68	12	22.03			3129	2950	2965			CTD on bottom		
CTD09	068		4	47.00	12	22.00			5123	2970	2985			fire bottles 1 + 2 trans 89.817		
CTD09	068									2936	2965			fire 3 and 4, trans 89.792		
CTD09	068									2930	2929			fire 5 and 6, trans 89.68		
											2929					
CTD09	068									2911				fire 7 and 8, trans 89.792		
CTD09	068									2861	2875			fire 9 and 10, trans 89.917		
CTD09	068									2811	2825			fire 11 and 12, trans 89.817		
CTD09	068									2000	2011			fire bottles 13-24, trans 89.841		
CTD09	068	21:55	4	47.67	12	21.90				-4				CTD on deck		
transit	068		4	47.61	12	23.68	292	4.9						transit to ABE recovery		
recovery	068		4	47.44	12	24.58	192	1.5						slowing down at ABE recovery location		
recovery		23:00	4	47.33	12	24.93	141	1.1						awaiting ABE to surface		
	068			47.36	12	24.85	136	1.0								
recovery	068	23:30	4	47.00				1.0								
recovery	068 068	23:30 23:40	4	47.00				1.0						ABE on surface		
recovery	068	23:30 23:40	4	41.00				1.0						ABE on surface manouvering towards ABE		
recovery	068 068	23:30 23:40 23:46	4	47.00				1.0								
recovery recovery recovery	068 068 068	23:30 23:40 23:46 00:32	4	46.02	12	23.71		1.0		20				manouvering towards ABE		
recovery recovery recovery recovery	068 068 068 069	23:30 23:40 23:46 00:32 01:42			12 12	23.71 23.71		1.0		20				manouvering towards ABE ABE on deck, end of dive150		
recovery recovery recovery RC12	068 068 068 069 069	23:30 23:40 23:46 00:32 01:42 01:52	4	46.02			136	1.1	3066	20				manouvering towards ABE ABE on deck, end of dive150 Chipper in water, Mapr 13 attached		
recovery recovery recovery RC12 RC12 RC12	068 068 069 069 069 069	23:30 23:40 23:46 00:32 01:42 01:52 03:40	4	46.02 46.02 46.00	12	23.71			3066	20				manouvering towards ABE ABE on deck, end of dive150 Chipper in water, Mapr 13 attached hydraulic pipe rupture-standing by		
recovery recovery recovery RC12 RC12 RC12	068 068 069 069 069 069	23:30 23:40 23:46 00:32 01:42 01:52 03:40	4 4 2: scienc	46.02 46.02 46.00	12 12	23.71 23.71			3066	20 BRIDGET	etc			manouvering towards ABE ABE on deck, end of dive150 Chipper in water, Mapr 13 attached hydraulic pipe rupture-standing by		
recovery recovery recovery RC12 RC12 RC12	068 068 069 069 069 069 069 CD1	23:30 23:40 23:46 00:32 01:42 01:52 03:40 69 Leg2	4 4 2: scienc Lat. (So	46.02 46.02 46.00	12 12 Long.	23.71 23.71		1.1	3066 Wat. depti	BRIDGET		Layback	Altitude	manouvering towards ABE ABE on deck, end of dive150 Chipper in water, Mapr 13 attached hydraulic pipe rupture-standing by		
recovery recovery recovery RC12 RC12 RC12 Operation	068 068 069 069 069 069 069 CD10	23:30 23:40 23:46 00:32 01:42 01:52 03:40 69 Leg2	4 4 2: scienc	46.02 46.02 46.00 ce log outh) Min	12 12 Long. (Deg	23.71 23.71 (West) Min	136 CMG	1.1 SMG	Wat. dept	BRIDGET Wire Out		Layback	Altitude	manouvering towards ABE ABE on deck, end of dive150 Chipper in water, Mapr 13 attached hydraulic pipe rupture- standing by starting back down 30m/min then 60m/min Comments		
recovery recovery recovery RC12 RC12 RC12 RC12 Operation RC12	068 068 069 069 069 069 CD10 Jday 069	23:30 23:40 23:46 00:32 01:42 01:52 03:40 69 Leg2 Time 04:35	4 4 2: scienc Lat. (So Deg	46.02 46.02 46.00 ce log	12 12 Long.	23.71 23.71 (West)	136	1.1		BRIDGET		Layback	Altitude	manouvering towards ABE ABE on deck, end of dive150 Chipper in water, Mapr 13 attached hydraulic pipe rupture- standing by starting back down 30m/min then 60m/min Comments 1st hit at 60m/min		
recovery recovery recovery RC12 RC12 RC12 RC12	068 068 069 069 069 069 069 CD10 Jday 069 069	23:30 23:40 23:46 00:32 01:42 01:52 03:40 69 Leg2 Time 04:35 04:39	4 4 2: scienc Lat. (So Deg	46.02 46.02 46.00 ce log outh) Min	12 12 Long. (Deg	23.71 23.71 (West) Min	136 CMG	1.1 SMG	Wat. dept	BRIDGET Wire Out		Layback	Altitude	manouvering towards ABE ABE on deck, end of dive150 Chipper in water, Mapr 13 attached hydraulic pipe rupture- standing by starting back down 30m/min then 60m/min Comments 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper		
recovery recovery recovery RC12 RC12 RC12 RC12 Operation RC12 RC12	068 068 069 069 069 069 CD1 Jday 069 069 069	23:30 23:40 23:46 00:32 01:42 01:52 03:40 69 Leg2 Time 04:35 04:39 05:40	4 4 2: science Lat. (So Deg 4	46.02 46.02 46.00 ce log uth) Min 45.97	12 12 Long. (Deg 12	23.71 23.71 (West) Min 23.84	136 CMG 135	1.1 SMG 1.3	Nat. depti 3062	BRIDGET Wire Out		Layback	Altitude	manouvering towards ABE ABE on deck, end of dive150 Chipper in water, Mapr 13 attached hydraulic pipe rupture- standing by starting back down 30m/min then 60m/min Comments 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper Chipper inboard. Start transit		
recovery recovery recovery RC12 RC12 RC12 RC12 RC12 RC12 RC12	068 069 069 069 069 069 CD1 069 069 069 069	23:30 23:40 23:46 00:32 01:42 01:52 03:40 69 Leg2 04:35 04:39 05:40 06:00	4 4 2: scienc Lat. (So Deg	46.02 46.02 46.00 ce log outh) Min	12 12 Long. (Deg	23.71 23.71 (West) Min	136 CMG	1.1 SMG	Wat. dept	BRIDGET Wire Out		Layback	Altitude	manouvering towards ABE ABE on deck, end of divel 50 Chipper in water, Mapr 13 attached hydraulic pipe rupture- standing by starting back down 30m/min then 60m/min Comments 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper Chipper inboard. Start transit confirmed on BRIDCEthat USBL pob retracted		
recovery recovery RC12 RC12 RC12 RC12 RC12 RC12 RC12 RC12	068 069 069 069 069 069 069 069 069 069 069	23:30 23:40 23:46 00:32 01:42 01:52 03:40 69 Leg2 04:35 04:39 05:40 06:00 06:18	4 4 2: scienc Lat. (So Deg 4 4	46.02 46.02 46.00 2e log uth) Min 45.97 46.83	12 12 Long. (Deg 12 12	23.71 23.71 (West) Min 23.84 24.92	136 CMG 135	1.1 SMG 1.3	Vat. dept 3062 2917	BRIDGET Wire Out		Layback	Altitude	manouvering towards ABE ABE on deck, end of dive150 Chipper in water, Mapr 13 attached hydraulic pipe rupture- standing by starting back down 30m/min then 60m/min Comments 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper Chipper inboard. Start transit confirmed on BRIDGEthat USBL pob retracted On station RC13 - hove-to		
recovery recovery RC12 RC12 RC12 RC12 RC12 RC12 RC12 RC12	068 069 069 069 069 069 069 069 069 069 069	23:30 23:40 23:46 00:32 01:42 01:52 03:40 69 Leg2 7 Time 04:35 04:39 05:40 06:00 06:18 06:32	4 4 2: science Lat. (So Deg 4	46.02 46.02 46.00 ce log uth) Min 45.97	12 12 Long. (Deg 12	23.71 23.71 (West) Min 23.84	136 CMG 135	1.1 SMG 1.3	Vat. deptl 3062 2917 2837	BRIDGET Wire Out 3237		Layback	Altitude	manouvering towards ABE ABE on deck, end of dive150 Chipper in water, Mapr. 13 attached hydraulic pipe rupture- standing by starting back down 30m/min then 60m/min Comments 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper Chipper inboard. Start transit confirmed on BRIDGEthat USBL pob retracted On station RC13 - hove-to RC13 chipper deployed at 60m/m		
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recovery recovery recovery recovery RC12 RC12 RC12 RC12 RC12 RC12 RC12 RC13 RC13 RC13 RC13 RC13 RC13 RC13 RC13	068 069 069 069 069 069 069 069 069 069 069	23:30 23:40 23:46 00:32 01:42 01:52 03:40 69 Leg2 7 Time 04:35 04:39 05:40 06:00 80:18 06:32 07:15 07:19 08:11 08:15 09:00	4 4 2: scienc Lat. (So Deg 4 4 4	46.02 46.02 46.00 e log uth) 45.97 46.83 47.44	12 12 Long. (Deg 12 12 12 12	23.71 23.71 (West) Min 23.84 24.92 24.66	136 CMG 135	1.1 SMG 1.3	Nat. deptl 3062 2917 2837 2831 2916	BRIDGET Wire Out 3237		Layback	Altitude	manouvering towards ABE ABE on deck, end of dive150 Chipper in water, Mapr 13 attached hydraulic pipe rupture- standing by starting back down 30m/min then 60m/min Comments 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper Chipper inboard. Start transit confirmed on BRIDGEthat USBL pob retracted On station RC13 - hove-to RC13 chipper deployed at 60m/m 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper MAPR on deck Chipper on deck -transit to RC14 on station RC14 - chipper in water		
recovery recovery recovery recovery RC12 RC12 RC12 RC12 RC12 RC12 RC12 RC13 RC13 RC13 RC13 RC13 RC13 RC13 RC13	0688 069 069 069 069 069 069 069 069 069 069	23:30 23:40 23:46 00:32 01:42 01:52 03:40 69 Leg2 7 Time 04:35 04:39 05:40 06:00 06:18 06:32 07:15 07:19 08:11 08:15 09:00 09:07	4 4 2: scienc Lat. (So Deg 4 4 4 4 4	46.02 46.02 46.00 2e log 100 45.97 46.83 47.44 47.36	12 12 Long. (Deg 12 12 12 12 12	23.71 23.71 West) Min 23.84 24.92 24.66 24.65	136 CMG 135	1.1 SMG 1.3	Nat. deptl 3062 2917 2837 2831 2831 2916 2916	BRIDGET Wire Out 3237 2947		Layback	Altitude	manouvering towards ABE ABE on deck, end of dive150 Chipper in water, Mapr 13 attached hydraulic pipe rupture- standing by starting back down 30m/min then 60m/min Comments 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper Chipper inboard. Start transit confirmed on BRIDGEthat USBL pob retracted On station RC13 - hove-to RC13 chipper deployed at 60m/m 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper MAPR on deck Chipper on deck- Chipper in water		
recovery recovery recovery RC12 RC12 RC12 RC12 RC12 RC12 RC12 RC13 RC13 RC13 RC13 RC13 RC13 RC13 RC14 RC14 RC14 RC14 RC14	068 068 069 069 069 069 069 069 069 069 069 069	23:30 23:40 23:46 00:32 01:42 01:52 03:40 69 Leg2 69 Leg2 7 7 10 04:35 04:35 04:35 04:35 04:35 05:40 06:00 06:18 06:32 07:15 07:15 07:15 07:15 09:07 10:21	4 4 2: scienc Lat. (So Deg 4 4 4 4 4	46.02 46.02 46.00 2e log 100 45.97 46.83 47.44 47.36	12 12 Long. (Deg 12 12 12 12 12	23.71 23.71 West) Min 23.84 24.92 24.66 24.65	136 CMG 135	1.1 SMG 1.3	Wat. deptl 3062 2917 2837 2831 2916 2916 2916 2884	BRIDGE1 Wire Out 3237 2947 3030		Layback	Altitude	manouvering towards ABE ABE on deck, end of diver 150 Chipper in water, Mapr 13 attached hydraulic pipe rupture- standing by starting back down 30m/min then 60m/min Comments 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper Chipper inboard. Start transit confirmed on BRIDCEthat USBL pob retracted On station RC13 - hove-to RC13 chipper deployed at 60m/m 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper MAPR on deck Chipper on deck -transit to RC14 on station RC14 - chipper in water MAPR in water Chipper on bottom		
recovery recovery recovery recovery RC12 RC12 RC12 RC12 RC12 RC12 RC12 RC13 RC13 RC13 RC13 RC13 RC13 RC13 RC14 RC14 RC14 RC14 RC14	068 068 069 069 069 069 069 069 069 069 069 069	23:30 23:40 23:46 00:32 01:42 01:52 03:40 069 Leg2 Time 04:35 04:39 05:40 06:00 06:18 06:32 07:15 07:19 08:11 08:15 09:00 09:07 10:02	4 4 2: scienc Lat. (So Deg 4 4 4 4 4	46.02 46.02 46.00 2e log 100 45.97 46.83 47.44 47.36	12 12 Long. (Deg 12 12 12 12 12	23.71 23.71 West) Min 23.84 24.92 24.66 24.65	136 CMG 135	1.1 SMG 1.3	Wat. deptl 3062 2917 2837 2831 2916 2916 2884 2886	BRIDGE1 3237 2947 3030 3025		Layback	Altitude	manouvering towards ABE ABE on deck, end of dive150 Chipper in water, Mapr 13 attached hydraulic pipe rupture- standing by starting back down 30m/min then 60m/min Comments 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper Chipper inboard. Start transit confirmed on BRIDGEthat USBL pob retracted On station RC13 - hove-to RC13 chipper deployed at 60m/m 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper MAPR on deck Chipper on deck -transit to RC14 on station RC14 - chipper in water MAPR in water chipper on bottom		
recovery recovery recovery recovery RC12 RC12 RC12 RC12 RC12 RC12 RC12 RC12	068 068 069 069 069 069 069 069 069 069 069 069	23:30 23:40 00:32 01:42 03:40 03:40 03:40 03:40 04:35 05:40 06:00 06:18 07:15 07:19 08:11 09:00 09:07 10:02 10:03 10:06	4 4 2: scienc Lat. (So Deg 4 4 4 4 4	46.02 46.02 46.00 2e log 100 45.97 46.83 47.44 47.36	12 12 Long. (Deg 12 12 12 12 12	23.71 23.71 West) Min 23.84 24.92 24.66 24.65	136 CMG 135	1.1 SMG 1.3	Wat. deptl 3062 2917 2837 2831 2916 2916 2916 2884	BRIDGE1 Wire Out 3237 2947 3030		Layback	Altitude	manouvering towards ABE ABE on deck, end of dive150 Chipper in water, Mapr 13 attached hydraulic pipe rupture- standing by starting back down 30m/min then 60m/min Comments 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper Chipper inboard. Start transit confirmed on BRIDGEthat USBL pob retracted On station RC13 - hove-to RC13 chipper deployed at 60m/m 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper MAPR on deck Chipper on deck -transit to RC14 on station RC14 - chipper in water MAPR in water chipper on bottom tension back on wire chipper on bottom		
recovery recovery RC12 RC12 RC12 RC12 RC12 RC12 RC12 RC12	068 068 069 069 069 069 069 069 069 069 069 069	23:30 23:40 00:32 01:42 01:52 03:40 03:40 03:40 03:40 04:35 04:39 05:40 06:00 06:00 06:00 06:00 06:00 06:01 06:01 06:01 06:01 06:01 09:07 10:02 10:02 10:02 10:02	4 4 2: scienc Lat. (So Deg 4 4 4 4 4	46.02 46.02 46.00 2e log 100 45.97 46.83 47.44 47.36	12 12 Long. (Deg 12 12 12 12 12	23.71 23.71 West) Min 23.84 24.92 24.66 24.65	136 CMG 135	1.1 SMG 1.3	Wat. deptl 3062 2917 2837 2831 2916 2916 2884 2886	BRIDGE1 3237 2947 3030 3025		Layback	Altitude	manouvering towards ABE ABE on deck, end of dive 150 Chipper in water, Mapr 13 attached hydraulic pipe rupture- standing by starting back down 30m/min then 60m/min Comments 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper Chipper inboard. Start transit confirmed on BRIDCEttat USBL pob retracted On station RC13 - hove-to RC13 chipper deployed at 60m/m 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper MAPR on deck. Chipper on bottom tension back on wire chipper on bottom tension back on wire		
recovery recovery RC12 RC12 RC12 RC12 RC12 RC12 RC12 RC12	068 068 069 069 069 069 069 069 069 069 069 069	23:30 23:40 00:32 01:42 01:52 03:40 03:40 03:40 03:40 04:35 04:39 05:40 06:00 06:00 06:00 06:00 06:00 06:01 06:01 06:01 06:01 06:01 09:07 10:02 10:02 10:02 10:02	4 4 2: scienc Lat. (So Deg 4 4 4 4 4	46.02 46.02 46.00 2e log 100 45.97 46.83 47.44 47.36	12 12 Long. (Deg 12 12 12 12 12	23.71 23.71 West) 23.84 24.92 24.66 24.65 24.05	136 CMG 135	1.1 SMG 1.3	Nat. deptl 3062 2917 2837 2831 2916 2916 2916 2884 2886 1898	BRIDGE1 3237 2947 3030 3025		Layback	Altitude	manouvering towards ABE ABE on deck, end of dive150 Chipper in water, Mapr 13 attached hydraulic pipe rupture- standing by starting back down 30m/min then 60m/min Comments 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper Chipper inboard. Start transit confirmed on BRIDGEthat USBL pob retracted On station RC13 - hove-to RC13 chipper deployed at 60m/m 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper MAPR on deck Chipper on deck -transit to RC14 on station RC14 - chipper in water MAPR in water chipper on bottom tension back on wire chipper on bottom		
recovery recovery recovery recovery RC12 RC12 RC12 RC12 RC12 RC12 RC12 RC12 RC13 RC13 RC13 RC13 RC13 RC13 RC14 RC14	068 068 069 069 069 069 069 069 069 069 069 069	23:30 23:40 00:32 01:42 01:52 03:40 69 Leg2 04:35 04:39 06:00 06:18 06:32 07:15 07:19 08:11 09:00 09:07 09:01 09:00 10:02 10:03 10:00 11:00	4 4 2: scienc Lat. (So Deg 4 4 4 4 4	46.02 46.02 46.00 2e log 100 45.97 46.83 47.44 47.36	12 12 Long. (Deg 12 12 12 12 12	23.71 23.71 West) Min 23.84 24.92 24.66 24.65	136 CMG 135	1.1 SMG 1.3	Wat. deptl 3062 2917 2837 2831 2916 2916 2884 2886	BRIDGE1 3237 2947 3030 3025		Layback	Altitude	manouvering towards ABE ABE on deck, end of dive 150 Chipper in water, Mapr 13 attached hydraulic pipe rupture- standing by starting back down 30m/min then 60m/min Comments 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper Chipper inboard. Start transit confirmed on BRIDCEttat USBL pob retracted On station RC13 - hove-to RC13 chipper deployed at 60m/m 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper MAPR on deck. Chipper on bottom tension back on wire chipper on bottom tension back on wire		
recovery recovery recovery recovery RC12 RC12 RC12 RC12 RC12 RC12 RC12 RC13 RC13 RC13 RC13 RC13 RC13 RC13 RC14 RC14 RC14 RC14 RC14 RC14 transit	068 068 069 069 069 069 069 069 069 069 069 069	23:30 23:40 00:32 01:42 01:52 03:40 69 Leg2 04:35 04:39 05:40 06:00 06:18 06:30 06:10 06:18 06:30 06:10 06:10 09:00 09:07 10:02 10:03 10:06 11:00 11:06	4 4 2: scienc Lat. (Soc Deg 4 4 4 4 4	46.02 46.00 26 log 26 log 27 log 46.83 45.97 46.83 47.44 47.36 49.59	12 12 12 12 12 12 12 12 12 12	23.71 23.71 West) 23.84 24.92 24.66 24.65 24.05	136 CMG 135	1.1 SMG 1.3	Nat. deptl 3062 2917 2837 2831 2916 2916 2916 2884 2886 1898	BRIDGE1 3237 2947 3030 3025		Layback	Altitude	manouvering towards ABE ABE on deck, end of dive150 Chipper in water, Mapr 13 attached hydraulic pipe rupture- standing by starting back down 30m/min then 60m/min Comments 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper Chipper inboard. Start transit confirmed on BRIDGEthat USBL pob retracted On station RC13 - hove-to RC13 chipper deployed at 60m/m 1st hit at 60m/min 2nd hit at 40m/min. Recovering chipper MAPR on deck Chipper on deck - transit to RC14 on station RC14 - chipper in water MAPR in water chipper on bottom tension back on wire chipper on bottom MAPR on deck Chipper on deck - transit to RC15		

RC15	069	11:34	1	1			1	1	3001	20				MAPR in water	
RC15	069		4	50.20	12	23.25	133	1.2	3051	1660				down at 60m/min	
RC15	069			50.13	12	23.12	134	0.9	3051	1000				hit bottom and then upto 3100wire out	
RC15	069			50.13	12	23.12	135	0.8	3046					2nd hit	
RC15	069			50.18	12	23.23	129	1.0	3029					rc15 on ndeck	
transit	069			49.34	12	23.12	092	9.4	2991					transit to abe launch site/stem check	
	069	14:00	4	48.53	12	48.53								hove to near abe launch site. Stem down	
	069	14:30	4	48.52	12	48.52	136	1.6	2992					will dunk ctd to 500m for cleaning	
	069	15:15	4	48.69	12	48.69	128	1.1	2983					settinng up for abe deck test	
	069	16:00		48.78	12	48.78	124	1.6	2985					conducting abe deck test	
	069	16:30	4	48.57	12	48.57	147	1.3	2979					still doing abe deck tests	
test 4	069		4	48.76	12	23.00								CTD in water	
test 4	069	17:20		48.68	12	23.01	121	1.4	2977					CTD at 500 m to fire all bottles	
test 4	069	17:36	4	48.60	12	23.03	119	1.0	2988					CTD on deck	
4.0.5.00	000	40.04	4	40.45	40	00.05								ADE manual deals toot	
ABE 02 ABE 02	069 069		4	48.45 48.57	12 12	22.95 22.95	125	1.6	2986					ABE passed deck test ABE in water	
ADE UZ	069	10.55	4	40.07	12	22.95	125	1.0	2900					ADE III WALEI	
CTD10	069	19:50	4	48.02	12	22.48			3003					CTD in water	
CTD10	069		4	47.95	12	22.40		1	0000	2970	2985			CTD on bottom, Bottles 1 & 2	
CTD10	069			+1.00	12	22.01			1	2945	2960			Bottles 3 & 4	
CTD10	069		1					1		2925	2940			Bottles 5 & 6	
CTD10	069		1					1		2883	2900			Bottles 7 & 8	
CTD10	069						1	1	1	2835	2850			Bottles 9 & 10	
CTD10	069	21:14								2810	2825			Bottles 11 & 12	
CTD10	069	21:18	4	47.96	12	22.50				2785	2800			Bottles 13 & 14	
CTD10	069									2760	2775			Bottles 15 & 16	
CTD10	069									2745	2760			Bottles 17 & 18	
CTD10	069		4	47.96	12	22.49				2725	2740			Bottles 19 & 20	
CTD10	069									2685	2700			Bottles 21 & 22	
CTD10	069									2585	2600			Bottles 23 & 24	
CTD10	069	22:28	4												
		-	-	47.98	12	22.45			3006					CTD on deck	
			-	47.90	12	22.45			3006						
СТД	069	22:31			12	22.45			3006					CTD on deck Stem Up	
	069	22:31	2: scien	ce log					3006	BRIDGE	etc				
CTD	069 CD1	22:31 69 Leg	2: sciene Lat. (Sc	ce log outh)	Long. ((West)	CMG	SMG		BRIDGE		Lavback	Altitude	Stem Up	
CTD	069 CD1 Jday	22:31 69 Leg	2: sciene Lat. (So Deg	ce log outh) Min	Long. (Deg	(West) Min	CMG 148		Wat. dept			Layback	Altitude	Stem Up Comments	
CTD	069 CD1	22:31 69 Leg Time 00:50	2: sciene Lat. (So Deg 4	ce log outh)	Long. ((West)	CMG 148 116	SMG 8.0 0.4				Layback	Altitude	Stem Up Comments transiting to Dredge 01 position	
CTD Operation Transit	069 CD1 Jday 070	22:31 69 Leg Time 00:50 01:30	2: scient Lat. (Sc Deg 4 4	ce log outh) Min 37.06 38.27	Long. (Deg 12	(West) Min 25.94	148	8.0	Wat. dept			Layback	Altitude	Stem Up Comments	
CTD Operation Transit DR01	069 CD1 Jday 070 070	22:31 69 Leg Time 00:50 01:30 01:45	2: scient Lat. (Sc Deg 4 4 4	ce log outh) Min 37.06	Long. (Deg 12 12	(West) Min 25.94 25.46	148 116	8.0 0.4	Wat. dept	Wire Out		Layback	Altitude	Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m	
CTD Operation Transit DR01 DR01	069 CD1 Jday 070 070 070	22:31 69 Leg 7 Time 00:50 01:30 01:45 02:08	2: scient Lat. (Sc Deg 4 4 4 4 4	ce log outh) Min 37.06 38.27 38.29	Long. (Deg 12 12 12	(West) Min 25.94 25.46 25.46	148 116 112	8.0 0.4 0.4	Vat. dept 3386	Wire Out		Layback	Altitude	Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m DR-01down at 50m/min	
CTD Operation Transit DR01 DR01 DR01 DR01 DR01	069 CD1 Jday 070 070 070 070 070 070	22:31 69 Leg 7 Time 00:50 01:30 01:45 02:08 02:45 03:00	2: sciend Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4	ce log buth) 37.06 38.27 38.29 38.29 38.30 38.33	Long. (Deg 12 12 12 12 12 12 12 12 12	(West) Min 25.94 25.46 25.30 25.35 25.35	148 116 112 262 248 319	8.0 0.4 0.4 0.4 0.0 0.2	Vat. dept 3386	600 1700 3255 3646		Layback	Altitude	Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m DR-01down at 50m/min S0m/min	
CTD Operation Transit DR01 DR01 DR01 DR01 DR01 DR01	069 CD1 Jday 070 070 070 070 070 070 070	22:31 69 Leg 7 Time 00:50 01:30 01:45 02:08 02:45 03:00 03:15	2: science Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4	ce log outh) 37.06 38.27 38.29 38.29 38.30 38.33 38.33	Long. (Deg 12 12 12 12 12 12 12 12 12 12	(West) Min 25.94 25.46 25.30 25.35 25.35 25.26	148 116 112 262 248 319 065	8.0 0.4 0.4 0.4 0.0 0.2 0.3	Vat. dept 3386	Wire Out 600 1700 3255 3646 3744		Layback	Altitude	Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m DR-01down at 50m/min 50m/min 50m/min 50m/min 50m/min switched controls to lab DR01 on bottom- forward at 0.5 knots 50m pinger altitude	
CTD Operation Transit DR01 DR01 DR01 DR01 DR01 DR01	069 CD1 Jday 070 070 070 070 070 070 070 070	22:31 69 Leg 00:50 01:30 01:45 02:08 02:45 03:00 03:15 03:30	2: scient Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4	ce log buth) 37.06 38.27 38.29 38.29 38.30 38.33 38.40 38.51	Long. (Deg 12 12 12 12 12 12 12 12 12 12	West) Min 25.94 25.46 25.46 25.30 25.35 25.35 25.26 25.18	148 116 112 262 248 319 065 118	8.0 0.4 0.4 0.4 0.0 0.2 0.3 0.8	Vat. dept 3386	Wire Out 600 1700 3255 3646 3744 3729		Layback	Altitude	Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m DR-01down at 50m/min 50m pinger altitude Nibbles	
CTD Operation Transit DR01 DR01 DR01 DR01 DR01 DR01 DR01	069 CD1 Jday 070 070 070 070 070 070 070 070 070 07	22:31 69 Leg 00:50 01:30 01:45 02:08 02:45 03:00 03:15 03:30 03:55	2: scient Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	ce log buth) 37.06 38.27 38.29 38.30 38.33 38.33 38.40 38.33 38.40 38.51 38.73	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12	West) Min 25.94 25.46 25.46 25.30 25.35 25.35 25.26 25.26 25.18 24.18	148 116 112 262 248 319 065 118 196	8.0 0.4 0.4 0.4 0.0 0.2 0.3 0.8 0.8	Vat. dept 3386	Wire Out 600 1700 3255 3646 3744 3729 3857		Layback	Altitude	Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m DR-01own at 50m/min 50m/min 50m/min 50m/min S0m/orin switched controls to lab DR01 on bottom- forward at 0.5 knots S0m pinger altitude Nibbles Bites at 50m off	
CTD Operation Transit DR01 DR01 DR01 DR01 DR01 DR01 DR01 DR01	069 CD1 Jday 070 070 070 070 070 070 070 070 070 07	22:31 69 Leg 00:50 01:30 01:45 02:08 02:45 03:00 03:15 03:30 03:55 04:13	2: scient Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	ce log buth) Min 37.06 38.27 38.29 38.29 38.30 38.30 38.30 38.30 38.51 38.73 38.96	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 25.94 25.46 25.46 25.30 25.35 25.35 25.26 25.18 25.26 25.18 24.18 24.77	148 116 112 262 248 319 065 118 196 119	8.0 0.4 0.4 0.0 0.2 0.3 0.8 0.8 0.7	Vat. dept 3386	Wire Out 600 1700 3255 3646 3744 3729		Layback	Altitude	Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m DR-01down at 50m/min 50m/min 50m/min switched controls to lab DR01 on bottom- forward at 0.5 knots 50m pinger altitude Nibbles Bites at 50m off Paying out at 15m/m	
CTD Operation Transit DR01 DR01 DR01 DR01 DR01 DR01 DR01 DR01	069 CD1 Jday 070 070 070 070 070 070 070 070 070 07	22:31 69 Leg 00:50 01:30 01:45 02:08 02:45 03:00 03:15 03:30 03:55 04:13 04:47	2: scient Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	ce log buth) 37.06 38.27 38.29 38.30 38.30 38.33 38.40 38.51 38.73 38.96 39.13	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 25.94 25.46 25.30 25.35 25.35 25.26 25.18 24.18 24.77 24.73	148 116 112 262 248 319 065 118 196 119 120	8.0 0.4 0.4 0.0 0.2 0.3 0.8 0.8 0.7 0.7	Vat. dept 3386	Wire Out 600 1700 3255 3646 3744 3729 3857 4013		Layback	Altitude	Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m DR-01down at 50m/min 50m/min 50m/min switched controls to lab DR01 on bottom- forward at 0.5 knots 50m pinger altitude Nibbles Bites at 50m off Paying out at 15m/m small bites	
CTD Operation Transit DR01 DR01 DR01 DR01 DR01 DR01 DR01 DR01	069 CD1 070 070 070 070 070 070 070 070 070 07	22:31 69 Leg 00:50 01:30 01:45 02:08 02:45 03:00 03:15 03:30 03:55 04:13 04:47 05:35	2: scient Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Min 37.06 38.27 38.29 38.30 38.31 38.40 38.51 38.73 38.91 38.93	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 25.94 25.46 25.30 25.35 25.35 25.26 25.18 24.18 24.77 24.73 24.77	148 116 112 262 248 319 065 118 196 119 120	8.0 0.4 0.4 0.0 0.2 0.3 0.8 0.8 0.7 0.7 0.7	Nat. dept	Wire Out 600 1700 3255 3646 3744 3729 3857 4013 3481		Layback	Altitude	Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m DR-01 in water, mapr and pinger on at 150m S0m/min 50m/min 50m/min S0m/min S0m pinger atitude Nibbles Bites at 50m off Paying out at 15m/m small bites off bottom- very slow coming up- bottom followed	
CTD Operation Transit DR01 DR01 DR01 DR01 DR01 DR01 DR01 DR01	069 CD1 Jdayy 070 070 070 070 070 070 070 070 070 0	22:31 69 Leg 00:50 01:30 01:45 02:08 02:45 03:00 03:15 03:30 03:55 04:13 04:47 05:35 05:44	2: scient Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	ce log buth) Min 37.06 38.27 38.29 38.30 38.33 38.40 38.51 38.73 38.96 39.13 39.08 39.08	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 25.94 25.46 25.30 25.35 25.35 25.26 25.18 24.18 24.77 24.77 24.70	148 116 112 262 248 319 065 118 196 119 120 120 090	8.0 0.4 0.4 0.2 0.3 0.8 0.8 0.7 0.7 0.7 0.1	Nat. depti 3386 3596 3477	Wire Out 600 1700 3255 3646 3744 3729 3857 4013		Layback	Altitude	Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m DR-01 in water, mapr and pinger on at 150m DR-01 in water, mapr and pinger on at 150m S0m/min 50m/min switched controls to lab DR01 on bottom- forward at 0.5 knots 50m pinger altitude Nibbles Bites at 50m off Paying out at 15m/m small bites off bottom- very slow coming up- bottom followed Hauling at 30 m/min	
CTD Operation Transit DR01 DR01 DR01 DR01 DR01 DR01 DR01 DR01	069 CD1 Jdayy 070 070 070 070 070 070 070 070 070 0	22:31 69 Leg 00:50 01:30 01:45 02:08 02:45 03:00 03:15 03:30 03:55 04:13 04:47 05:35 05:44 06:00	2: science Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Min 37.06 38.27 38.29 38.30 38.31 38.40 38.51 38.73 38.91 38.93	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 25.94 25.46 25.30 25.35 25.35 25.26 25.18 24.18 24.77 24.73 24.77	148 116 112 262 248 319 065 118 196 119 120	8.0 0.4 0.4 0.0 0.2 0.3 0.8 0.8 0.7 0.7 0.7	Nat. dept	Wire Out 600 1700 3255 3646 3744 3729 3857 4013 3481		Layback	Altitude	Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m DR-01 down at 50m/min 50m pinger altitude Nibles Bites at 50m off Paying out at 15m/m small bites off bottom- very slow coming up- bottom followed Hauling at 30 m/min Hauling at 35 m/min	
CTD Operation Transit DR01 DR01 DR01 DR01 DR01 DR01 DR01 DR01	069 CD1 Jdayy 070 070 070 070 070 070 070 070 070 0	22:31 69 Leg 00:50 01:30 01:45 02:08 02:45 03:00 03:15 03:30 03:55 04:13 04:47 05:35 05:44 06:00	2: science Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	ce log buth) Min 37.06 38.27 38.29 38.30 38.33 38.40 38.51 38.73 38.96 39.13 39.08 39.08	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 25.94 25.46 25.30 25.35 25.35 25.26 25.18 24.18 24.77 24.77 24.70	148 116 112 262 248 319 065 118 196 119 120 120 090	8.0 0.4 0.4 0.2 0.3 0.8 0.8 0.7 0.7 0.7 0.1	Nat. depti 3386 3596 3477	Wire Out 600 1700 3255 3646 3744 3729 3857 4013 3481		Layback	Altitude	Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m DR-01 in water, mapr and pinger on at 150m DR-01 in water, mapr and pinger on at 150m S0m/min 50m/min switched controls to lab DR01 on bottom- forward at 0.5 knots 50m pinger altitude Nibbles Bites at 50m off Paying out at 15m/m small bites off bottom- very slow coming up- bottom followed Hauling at 30 m/min	
CTD Operation Transit DR01 DR01 DR01 DR01 DR01 DR01 DR01 DR01	069 CD1 Jday 070 070 070 070 070 070 070 07	22:31 69 Leg 00:50 01:30 01:45 02:08 02:45 03:00 03:15 03:30 03:55 04:13 04:47 05:35 05:44 06:00 07:35	2: science Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	ce log outh) Min 37.06 38.27 38.29 38.30 38.30 38.33 38.40 38.51 38.73 38.96 39.13 39.08 39.05 39.11	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 25.94 25.46 25.30 25.35 25.35 25.26 25.18 24.18 24.77 24.77 24.70 24.80	148 116 112 262 248 319 065 118 196 119 120 090 120 090	8.0 0.4 0.4 0.2 0.3 0.8 0.8 0.7 0.7 0.7 0.7 0.1	Nat. dept 3386 3596 3477 3471	Wire Out 600 1700 3255 3646 3744 3729 3857 4013 3481		Layback	Altitude	Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m DR-01 down at 50m/min 50m pinger altitude Nibles Bites at 50m off Paying out at 15m/m small bites off bottom- very slow coming up- bottom followed Hauling at 30 m/min Hauling at 35 m/min	
CTD Operation Transit DR01 DR01 DR01 DR01 DR01 DR01 DR01 DR01	069 CD1 Jdayy 070 070 070 070 070 070 070 070 070 0	22:31 69 Leg 00:50 01:30 01:45 02:08 02:45 03:00 03:15 03:30 03:55 03:30 03:55 04:13 04:47 05:35 05:44 06:00 07:35	2: science Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	ce log buth) Min 37.06 38.27 38.29 38.30 38.33 38.40 38.51 38.73 38.96 39.13 39.08 39.08	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 25.94 25.46 25.30 25.35 25.35 25.26 25.18 24.18 24.77 24.77 24.77 24.77 24.80 24.80	148 116 112 262 248 319 065 118 196 119 120 120 090	8.0 0.4 0.4 0.2 0.3 0.8 0.8 0.7 0.7 0.7 0.1	Nat. depti 3386 3596 3477	Wire Out 600 1700 3255 3646 3744 3729 3857 4013 3481		Layback	Altitude	Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m DR-01 down at 50m/min 50m/min 50m/min switched controls to lab DR01 on bottom- forward at 0.5 knots 50m pinger altitude Nibbles Bites at 50m off Paying out at 15m/m small bites off bottom- very slow coming up- bottom followed Hauling at 30 m/min Hauling at 35 m/min Dredge on deck. Set course for WP 41 (No. TBC)	
CTD Operation Transit DR01 DR01 DR01 DR01 DR01 DR01 DR01 DR01	069 CD1 Jday 070 070 070 070 070 070 070 070 070 07	22:31 69 Leg 00:50 01:30 01:45 02:08 02:45 03:00 03:15 04:13 04:47 05:35 04:13 04:47 05:35 05:44 06:00 07:35 08:00 08:17	2: scient Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	ce log buth) Min 37.06 38.29 38.29 38.30 38.30 38.33 38.40 38.51 38.73 38.96 39.13 39.08 39.05 39.11 39.11 39.84 39.84 39.84	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 25.94 25.46 25.30 25.35 25.35 25.26 25.18 24.77 24.73 24.77 24.70 24.80 24.80 24.80 24.80	148 116 112 262 248 319 065 118 196 119 120 120 090 160 	8.0 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.3 0.8 0.7 0.7 0.7 0.1 1.0 8.7 8.5	Wat. dept 3386 3596 3477 3477 3471 3605 2669	Wire Out 600 1700 3255 3646 3744 3729 3857 4013 3481		Layback	Altitude	Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m DR-01 in water, mapr and pinger on at 150m S0m/min 50m/min switched controls to lab DR01 on bottom- forward at 0.5 knots 50m pinger altitude Nibbles Bites at 50m off Paying out at 15m/m small bites off bottom- very slow coming up- bottom followed Hauling at 30 m/min Hauling at 35 m/min Dredge on deck. Set course for WP 41 (No. TBC) A/C onto survey line	E 2 site
CTD Operation Transit DR01 DR01 DR01 DR01 DR01 DR01 DR01 DR01	069 CD1 Jday 07000 0700 0700 0700 0700 0700 0700 0700 0700 0	22:31 69 Leg 0:50 01:30 01:45 02:45 03:00 03:15 03:30 03:55 04:13 04:47 05:35 05:44 06:00 07:35	2: scient Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	ce log buth) Min 37.06 38.27 38.29 38.30 38.33 38.40 38.51 38.73 38.96 39.13 39.08 39.05 39.11 39.08	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 25.94 25.46 25.30 25.35 25.35 25.26 25.18 24.18 24.77 24.77 24.77 24.77 24.80 24.80	148 116 112 262 248 319 065 118 196 119 120 120 090 160	8.0 0.4 0.4 0.4 0.4 0.2 0.3 0.8 0.7 0.7 0.1 1.0 8.7	Vat. dept 3386 3596 3477 3471 3605	Wire Out 600 1700 3255 3646 3744 3729 3857 4013 3481		Layback	Altitude	Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m DR-01 down at 50m/min 50m/min 50m/min switched controls to lab DR01 on bottom- forward at 0.5 knots 50m pinger altitude Nibbles Bites at 50m off Paying out at 15m/m small bites off bottom- very slow coming up- bottom followed Hauling at 30 m/min Hauling at 35 m/min Dredge on deck. Set course for WP 41 (No. TBC)	E 2 site
CTD Operation Transit DR01 DR01 DR01 DR01 DR01 DR01 DR01 DR01	069 CD1 Jday 070 070 070 070 070 070 070 07	22:31 69 Leg 7 Time 00:50 01:30 01:45 02:48 02:45 03:00 03:15 03:15 03:30 03:15 03:30 03:45 05:44 06:00 07:35 05:44 06:00 08:54 08:54 09:35	2: scient Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	ce log with) Min 37.06 38.27 38.29 38.29 38.30 38.33 38.40 38.51 38.73 38.96 39.13 39.05 39.05 39.11 39.84 39.44 39.84 39.420	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 25.94 25.46 25.35 25.35 25.35 25.35 25.35 25.41 24.77 24.77 24.70 24.80 23.19 20.61 19.12	148 116 112 248 319 065 118 196 119 120 090 160 120 090 160	8.0 0.4 0.4 0.4 0.2 0.3 0.8 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7	Vat. dept 3386 3596 3477 3471 3605 2669 2229	Wire Out 600 1700 3255 3646 3744 3729 3857 4013 3481		Layback	Altitude	Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m DR-01 in water, mapr and pinger on at 150m DR-01 in water, mapr and pinger on at 150m DR-01 in water, mapr and pinger on at 150m DR-01 in water, mapr and pinger on at 150m DR-01 in water, mapr and pinger on at 150m S0m/min 50m/min switched controls to lab DR01 on bottom- forward at 0.5 knots 50m pinger altitude Nibbles Bites at 50m off Paying out at 15m/m small bites off bottom- very slow coming up- bottom followed Hauling at 30 m/min Dredge on deck. Set course for WP 41 (No. TBC) A/C onto survey line EM12 logging bad data. Logging off.Abandon survey. A/C to AE	E 2 site
CTD Operation Transit DR01 DR01 DR01 DR01 DR01 DR01 DR01 DR01	069 CD1 Jdayy 070 070 070 070 070 070 070 0	22:31 69 Leg 7 Time 00:500 01:30 01:45 02:08 02:45 03:00 03:315 03:30 03:35 03:30 03:35 05:34 05:35 05:34 06:00 07:35 05:34 08:00 08:17 08:54 09:35 09:35	2: scient Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	ce log with) Min 37.06 38.27 38.29 38.29 38.30 38.33 38.40 38.51 38.73 38.96 39.13 39.05 39.05 39.11 39.84 39.44 39.84 39.420	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 25.94 25.46 25.35 25.35 25.35 25.35 25.35 25.41 24.77 24.77 24.70 24.80 23.19 20.61 19.12	148 116 112 248 319 065 118 196 119 120 090 160 120 090 160	8.0 0.4 0.4 0.4 0.2 0.3 0.8 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7	Vat. dept 3386 3596 3477 3471 3605 2669 2229	Wire Out 600 1700 3255 3646 3744 3729 3857 4013 3481		Layback	Altitude	Stem Up Stem Up Comments transiting to Dredge 01 position DR-01 in water, mapr and pinger on at 150m DR-01 down at 50m/min 50m/min 50m/min switched controls to lab DR01 on bottom- forward at 0.5 knots 50m pinger altitude Nibbles Bites at 50m off Paying out at 15m/m small bites off bottom- very slow coming up- bottom followed Hauling at 30 m/min Hauling at 30 m/min Dredge on deck. Set course for WP 41 (No. TBC) A/C onto survey line EM12 logging bad data. Logging off.Abandon survey. A/C to AE EOT to ABE2. USBL deployment	E 2 site
CTD Operation Transit DR01 DR01 DR01 DR01 DR01 DR01 DR01 DR01	069 CD1 Jday 070 070 070 070 070 070 070 070 070 07	22:31 69 Leg 7 Time 00:50 01:30 01:45 02:04 03:15 03:30 03:45 03:30 03:55 04:13 04:47 05:35 05:34 06:30 07:35 05:34 06:30 08:50 08:50 08:50 09:35 09:50 10:00	2: scient Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	ce log buth) Min 37.06 38.27 38.29 38.30 38.30 38.40 38.51 38.73 38.40 39.13 39.08 39.05 39.11 39.05 39.11 39.05 39.11 39.46 44.20 48.10	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12 1	West) Min 25.94 25.46 25.30 25.35 25.35 25.26 25.18 24.77 24.73 24.77 24.70 24.70 24.80 24.90 24.80 24.91 24.91 24.91 24.91 24.91 24.91 24.91 24.91 24.91 22.51 22.52	148 116 112 262 248 319 065 118 196 119 120 120 090 160 076 110 174 178 311	8.0 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.2 0.3 0.8 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.1 1.0 8.7 8.5 9.1 1.1 0.3	Wat. depti 3386 3596 3596 3477 3477 3471 3605 2669 2299 2902	Wire Out 600 1700 3255 3646 3744 3729 3857 4013 3481		Layback	Altitude	Stem Up	E 2 site
CTD Operation Transit DR01 DR01 DR01 DR01 DR01 DR01 DR01 DR01	069 CD1 Jday 070 070 070 070 070 070 070 070 070 07	22:31 69 Leg 00:50 01:30 01:45 02:45 02:45 03:00 03:55 04:13 03:55 04:13 05:35 04:47 05:35 04:47 05:35 04:47 05:35 04:47 05:35 04:47 05:35 04:47 05:35 04:47 05:35 04:47 05:35 04:47 05:35 04:47 04:47 05:35 04:47 04:47 04:37 04:47 05:35 04:47 04 04:47 04 04:47 04 04 04 04 04 04 04 04 04 04 04 04 04	2: scient Lat. (Sc Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	ce log outh) Min 37.06 38.27 38.29 38.30 38.30 38.30 38.40 38.51 38.73 38.96 39.08 39.05 39.05 39.01 39.05 39.05 39.05 39.11 39.84 43.20 44.20 48.17 48.52	Long. (Deg 12 12 12 12 12 12 12 12 12 12 12 12 12	West) Min 25.94 25.46 25.35 25.35 25.26 25.18 24.18 24.77 24.77 24.70 24.80 23.19 20.61 19.12 22.51 22.52 22.33	148 116 112 262 248 319 065 118 196 119 120 090 160 076 1174 311 311	8.0 0.4 0.4 0.4 0.0 0.2 0.3	Wat. dept 3386 3596 3596 3596 3477 3471 3477 3471 3605 2669 2229 2999 2002 2999	Wire Out 600 1700 3255 3646 3744 3729 3857 4013 3481		Layback	Altitude	Stem Up	E 2 site
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BG12 0/1 1/.24 4 45.00 12 25./0 110 0.0 3223 Diluget II water	DR02 DR02 DR02 DR02 DR02 DR02 DR02 DR02	070 070 070 071 071 071 071 071 071 071	22311 22:36 22:50 00:20 00:35 00:43 00:50 00 00:50 00 00:50 00 00:50 00 00:50 00 00 00:50 00 00 00:50 00 00 00 00 00 00 00 00 00 00 00 00 0		45.25 45.33 47.83 47.86 47.76 47.76 47.76 47.76 48.69 48.96 48.96 48.96 48.74 48.78 48.74 48.78	12 12 12 12 12 12 12 12 12 12 12 12 12 1	21.86 21.90 27.50 22.65 22.56 22.56 22.56 22.51 22.28 22.31 22.28 22.31 22.44 22.51 22.44	262	0.1 	3232 3227 3238 3220 3009 3009 3022 3005 2005	3555 3395 336				increase veer 15m/m stop veer - haul 10m/m increase haul 15m/m dredge off bottom increase haul 50m/m hauling in at 38m/min DR02 on deck In transit to CTD 12 On station CTD broken CTD broken still CTD fixed b but leave for 30 mins to confirm sensor plugged in CTD in water CTD modular errors, broken, bringing back CTD on water CTD modular errors, broken, bringing back CTD on deck and sensor off sensor on CTD 7 on CTD stopped haul 30m/m on deck - sensor off ABE deck testing ABE passed deck test ABE ready - winch broken Stand down - ABE probs ABE in water ABE at 1430m depth ABE is for the mooring On way to BGT-02	Image: Section of the sectio	
	DR02 DR02 DR02 DR02 DR02 DR02 DR02 DR02	070 070 070 071 071 071 071 071 071 071	22311 22:36 22:45 22:50 00:20 00:35 00:35 00:35 00:30 00:35 00:03 00:30 00:30 00:30 00:30 00:30 00:30 00:414 04:37 07:01 07:04 04:37 07:01 07:04 07:09 07:13 10:10 11:00 11:00 15:10 15:10 17:00 17:12		45.25 45.33 47.83 47.86 47.76 47.76 48.61 48.69 48.69 48.64 48.96 48.78 48.78 48.74 48.76 48.76 48.76 48.76 48.76 48.76 48.76 48.76 48.61 48.76	12 12 12 12 12 12 12 12 12 12 12 12 12 1	21.86 21.90 27.50 22.65 22.56 22.56 22.51 22.51 22.44 22.31 22.41 22.41 22.44 23.62	262	0.1	3232 3227 3238 3220 3009 3009 3022 3005 2005 2988	3555 3395 336				increase veer 15m/m stop veer - hau 10m/m increase haul 15m/m dredge off bottom increase haul 50m/m hauling in at 38m/min DR02 on deck In transit to CTD 12 On station CTD broken CTD broken still CTD fixed b but leave for 30 mins to confirm sensor plugged in CTD in water CTD modular errors, broken, bringing back CTD on deck and sensor off sensor on CTD at 3m CTD at 3m CTD stopped haul 30m/m on deck - sensor off ABE deck testing ABE passed deck test ABE ready - winch broken Stand down - ABE probs ABE in water ABE at 1430m depth ABE aff the mooring On way to BGT-02, manouvering ship	Image: Amage:	

BGT2	071	17:28												Stop for test at 50 m	т т	
BGT2	071	17:28												Paying out at 30 m/min	-	
BGT2	071	17:29	4	45.90	12	23.70	175	1.0		92				10 kHz switched on	-	
BGT2	071	17:45	4	46.03	12	23.64	159	1.0	3063	537	554			spikes on nephels, BGT HDG 165°	-	
BGT2	071	18:00	4	46.10	12	23.50	163	1.1	3140	981	903	573		spikes on nephels, BGT HDG 141°		
BGT2	071	18:11		10.10		20.00	100		0110	001	000	0.0		Bridget rebooted	+ +	
BGT2	071	18:15	4	46.23	12	23.50	114	0.8	3123	1460	1468			CTD crashed, BGT HDG 173°		
BGT2	071	18:30	4	46.30	12	23.40	135	0.6	3107	1904	1890	420				
BGT2	071	18:45	4	46.44	12	23.30	189	0.7	3084	2441	2424	478		Bridget reboot		
BGT2	071	19:00	4	46.52	12	23.21	187	0.9	3082	2813	2776	645		Bridget reboot		
BGT2	071	19:03								2900				Bridget reboot		
BGT2	071	19:15	4	46.70	12	23.08	140	0.5	3024	2901				Bridget DA down		
BGT2	071	19:18	4	46.75	12	23.00	143	0.9	3093	2901				hauling at 30m/min. At WP 43. Start survey line.		
BGT2		19:23												Bridget reboot		
BGT2	071	19:26												Bridget reboot		
BGT2	071	19:27	4	46.91	12	23.00	156	1.4	3096	2657	2547	947		stop winch. Pay out at 30 m/min		
	CD1	69 Leg2	: scienc	e log												
			Lat. (So		Long. (West)				BRIDGET	etc					
Operation	Jday	Time	Deg	Min	Deg	Min	CMG	SMG	Nat. depti	Wire Out	Depth	Layback	Altitude	Comments		
BGT2	071	19:30												Bridget reboot	T	
BGT2	071	19:32												Stop winch. Reboot.		
BGT2	071	19:34						_	3093	2610	2630			Power off/reboot		
BGT2	071	19:44												Bridget back on. Veering at 30 m/min		
BGT2	071	19:57							3045	3074	2825	1402		Stop winch. Bridget crash.		
BGT2	071	20:01	4	47.46	12	22.77	139	0.9	3067	3074				BRIDGET re-boot		
BGT2	071	20:08						_	3051	3074	2804	1450		veer 30m/m		
BGT2	071	20:10							3038	3182	2857	1591		BRIDGET stop - re-boot		
BGT2	071	20:12												bottle 1 fired		
BGT2	071	20:13									2884			bottle 2 fired		
BGT2	071	20:14								3244	2890	1664		bridged stop - winchj stop		
BGT2	071	20:15												haul 30m/m (should be veering)		
BGT2	071	20:17												veer 30m/m bridget dead		
BGT2	071	20:20							3019	3237	2870	1687		bottle 3 failed - bridget dead - winch stop		
BGT2	071	20:21							3012	3237	2872	1683		bottle 3 fired - veer 30m/m		
BGT2	071	20:22							3001	3259				bridget dead - winch stop		
BGT2	071	20:24							0040	0050	0005	1700	100	back again - o, no, dead again		
BGT2	071	20:29							3018	3259	2885	1706	120	veer 30m/m		
BGT2		20:31	4	48.00	12	22.75	072	1.1	3013	3330	0007	1=0=			+ +	
BGT2		20:31							3011	3346	2967	1737		winch stop		
BGT2		20:34								3347			76	bottle 4 fired	+ +	
BGT2	071 071	20:34							0047	0047	0007	1739	74	bridget dead	+ +	
BGT2		20:37							3017	3347	2967	1739	74	haul 30m/m		
BGT2	071	20:37							0045	0040	00.40	4700		bridget dead - winch stop		
BGT2	071	20:39							3015	3319	2940	1730		haul 30m/m		
BGT2 BGT2	071 071	20:40 20:59	4	48.46	12	22.45	193	2.1	2991	2764				bridget dead - haul to 2500m	+	
BGT2 BGT2	071	20:59	4	40.40	12	22.40	192	2.1	2991	2764 2400	2023	1481		winch stop - bottle 5 failed	+	
BGT2 BGT2	071	21:00							2980	2400	2023	1401		bottle 6 fired	+	
BGT2 BGT2	071	21:12							2983	2400				haul 30 to recover	+ +	
BGT2 BGT2		21:34	4	49.11	12	22.24	142	1.3	2963	1853					+ +	
BGT2	071	22:00	4	49.60	12	22.24	220	1.3	2930	1131					+	
BGT2	071	22:30	4	50.13	12	21.86	145	1.1	3006	219					+	
BGT2	071	22:30	,	00.10	. 2	200	. 10		0000	210				Bridget on surface - all stop	+	
BGT2		22:49	4	50.34	12	21.89			3011	-9				Bridget on deck	++	
2012	571		,	00.04	. 2	200			5511	5					+	
Transit	071	23:10	4	50.62	12	21.53	056	2.7	3007					Transit to RC16	++	
Transit	071	23:30	4	49.28	12	21.60	350	4.5	2886						++	
RC16	072	00:34	4	45.20	12	21.40	001	4.0	3352					heading toward RC16	+ +	
RC16	072	01:00	4	47.50	12	21.40	165	5.4	2962					heading toward RC16	+ +	
RC16	072	01:30	4	48.51	12	21.29	322	0.4	2911	50	2906			mapr on at 20m/min/ down at 25m/min	+	
RC16	072	01:50	4	48.51	12	21.30	000	0.1	2915	1000				down at 50m/min	+ +	
RC16	072	00:23	4	48.28	12	21.15	104	1.1	2906	2998				HIT on bottom	+ +	
RC16	072	02:29	4	48.28	12	21.30	102	0.9	2898	2998				2nd Hit on bottom	+ +	
RC16	072	02:45	4	48.28	12	21.30	164	0.2	2901	2300				hauling in at 60m/min		
RC16	072	03:00	4	48.57	12	21.13	003	0.2	2892	1317				hauling in at 60m/min	1	
RC16	072	03:40	4	48.20	12	22.05	357	0.2	2970					RC16 on deck		
Transit	072	03:45		-					-					Transit to ABE 2 recovery site		
ABE3			4	48.18	12	22.70	050	0.5	3014					Hove to on recovery site	+ +	
								2.0								

ABE3	072	05:45												ABE on surface	1	
			4	48.64	40	00.00	450	47	2994							
ABE3	072		4	48.64	12	23.03	153	1.7	2994					ABE on deck		
Swath	072													USBL pod retracted. EM12 logging on		
Swath	072	07:00	4	49.79	12	21.70	124	7.3	2990					Transit to WP 45		
Swath	072	07:30	4	51.69	12	18.40	119	7.7	2272							
Swath	072		4	52.46	12	17.10		7.9	2533					at WP 45 A/C		
owath			2: scienc		12	17.10		1.5	2000							
	CDI	UJ Legi			Long ((Meet)				BRIDGET	' at a					
		_	Lat. (So		Long. (west)										
Operation			Deg	Min	Deg	Min	CMG			Wire Out	Depth	Layback	Altitude	Comments		
Swath	072	07:47	4	53.20	12	16.70	163	8.5	2578					on course 163 to WP 46		
CTD13	072	08:31	4	59.04	12	14.82	160	0.4	2679					Hove-to for CTD test dip		
CTD13	072	08:45												CTD test dip cancelled		
swath	072	09:03	4	59.09	12	14.81	165	0.9	2681					resume swath survey - swath angle increased to 120°		
	072	09:31	5	1.99	12	13.91	160	8.8	2750					resume swath survey - swath angle increased to 120		
Swath																
Swath	072	10:00	5	6.23	12	12.66	161	9.9	3672							
Swath	072		5	7.86	12	12.09			3751					changing course		
CTD14	072	10:14	5	7.94	12	11.86	120	7.2						Heaving to for CTD wire test		
CTD14	072	10:22	5	8.19	12	11.68		0.3	3911					On station for CTD dip		
CTD14	072	10:30	5	8.12	12	11.41			3758					In water		
CTD14	072	10:55	5	8.17	12	11.71								At 1000m		
CTD14	072	10:57	5	0.11										Fire allbottles 1-24		
				0.40	10	44.00	I	I								
CTD14	072	11:20	5	8.18	12	11.66								CTD on deck		
Swath	072	11:26	5	8.18	12	11.66								resuming swath		
Swath	072	11:32	5	8.05	12	11.32	060	5.4	3758							
Swath	072	11:56	5	6.95	12	8.22	056	9.7	4034					starting turn		
Swath	072	12:30	5	2.51	12	9.60	342	9.6	2825					swath survery		
Swath	072	13:00	4	56.43	12	11.33	341	9.5	2304					swath survery		
Swath	072		4	52.22	12	12.62	346	9.1	2518					swath survery		
Swath	072	14:06	4	47.65	12	13.44	338	9.5	2132					swath survery		
		14:30		44.05	12	15.91	343	10.0	1895							
Swath	072		4											swath survery		
Swath	072	15:04	4	38.65	12	16.87	343	9.9	2087					swath survery		
Swath	072	15:30	4	34.36	12	19.09	262	10.0	2156					swath survery		
Swath	072	16:00	4	32.60	12	23.55	263	9.9	3233					swath survery		
Swath	072	16:30	4	38.85	12	28.47	246	9.1	3244					swath survery		
Swath	072	16:54	4	39.88	12	32.15	250	8.9	2986					starting turn		
Swath	072	17:00	4	40.37	12	32.58	198	8.3	2939					a/c w.p - o/c17:01		
Swath	072	17:30	4	44.70	12	33.95	197	8.5	2368							
Swath	072		4	45.87	12	34.08	171	7.6	2524					o/c		
Swath	072	18:00	4	49.68	12	33.29	173	7.8	2608					0/0		
			4	49.00	12	33.29	175	1.0	2000					- /- (
Swath	072			10.01	40		004		0005					a/c for ctd 014		
Transit	072	18:30	4	49.31	12	30.09	081	8.7	2665							
Transit	072	19:00	4	48.77	12	25.88	087	7.7	2779							
Transit	072	19:15	4	48.56	12	23.75	078	8.8	2997					heading for rc017		
Transit	072	19:30	4	48.53	12	22.60	082	2.0	2998					arriving on station rc017		
RC17	072	20:00	4	48.65	12	22.65	323	1.3	2988					RC17 in water		
RC17	072	20:03												MAPR on 20m		
RC17	072	20:59								3054	2986	831		on bottom		
RC17	072									3054	2000	551		tension back		
	072				I	—	I	I			2986	787				
RC17										3045	2900	101		steady cable		
RC17	072									3045				recovering		
RC17	072													MAPR on deck		
RC17	072	22:05												chipper on deck - transit to RC18		
RC18	072	22:25	4	47.80	12	22.47								At RC18		
Transit	072													RC18 cancelled - steaming to CTD 15		
	1											-				
CTD15	072	22:55	4	48.61	12	22.40			2988					Traget - 4 48.59 12 22.41		
CTD15 CTD15			4	40.01	12	22.40			2300							
	072			40.50	40	00.00			0004					Pump on		
CTD15	072		4	48.56	12	22.39			2984	-2				CTD in water		
CTD15	072	23:35	4	48.57	12	22.38								ship's position check		
CTD15	073	00:00	4	48.55	12	22.39				1742						
CTD15	073	00:15	4	48.59	12	22.43			2985	2515						
CTD15	073		4	48.58	12	22.43			2986	2925				winch stop		
			2: science						1							
	1		Lat. (So		Long. ((West)				BRIDGET	etc					
Operation	.Idav	Time	Deg	Min	Deg	Min	CMG	SMG	Wat, denti	Wire Out		Layback	Altitude	Comments		
CTD15			4	48.58	12	22.43	55	55	2984	2925	2975	Luybuok		B# 1 & 2		
01013	013	00.20	4	40.00	12	22.43			∠304	2920	2313			υπια 2		

CTUE OP OP OP OP OP<	07045	070	00.04		10 50	10	00.44	1	1	0005	0000	0000			B# 0.0.1	1	
CTUPS GT	CTD15			4	48.58	12	22.41			2985	2880	2902			B# 3 & 4		
CTUB 073 062 4 46.95 12 22.42 1 <th1< th=""> <th1< th=""> <th1< th=""></th1<></th1<></th1<>																	
CTDIS OT3 OT3 OT3 A 45.00 12 2.20 2.22 2.20 2.22 2.20 2.22 2.20 <th2.20< th=""> <th2.20< th=""> <th2.20< td="" th<=""><td>CTD15</td><td>073</td><td>00:45</td><td>4</td><td>48.56</td><td>12</td><td></td><td></td><td></td><td>2984</td><td>2780</td><td>2801</td><td></td><td></td><td>B# 7 & 8</td><td></td><td></td></th2.20<></th2.20<></th2.20<>	CTD15	073	00:45	4	48.56	12				2984	2780	2801			B# 7 & 8		
CTDIS OT Dist A 40.0 12 22.41 23.00 2822 Be11 Be11 A <th< td=""><td>CTD15</td><td>073</td><td>00:52</td><td>4</td><td>48.58</td><td>12</td><td>22.42</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	CTD15	073	00:52	4	48.58	12	22.42										
CTDIS OT Dist A 40.0 12 22.41 23.00 2822 Be11 Be11 A <th< td=""><td>CTD15</td><td>073</td><td>00:58</td><td>4</td><td>48.59</td><td>12</td><td>22.42</td><td></td><td></td><td></td><td>2925</td><td>2947</td><td></td><td></td><td>B# 9 & 10</td><td></td><td></td></th<>	CTD15	073	00:58	4	48.59	12	22.42				2925	2947			B# 9 & 10		
CTUB 073 014 4 459 12 22.42 N 2800 2800 BF12 BF12 N N CTUB 073 0111 4 459 12 22.42 PT72 2000 BF13 CUBUAIS PT72 2000 BF13 CUBUAIS PT72 PT72 2000 PT72																	
CTOPS OTS Dirt 4 44.59 12 2.22 N P																	
CTD15 OT3 OT48 4 12 12 14 12 12 14 14 12 14 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>																	
CTOPS G73 G73 G74 4 46.50 12 22.41 A P2782 B874 Main Magn Main					48.59		22.42				2782	2803					
CTD15 OT3 013 04. 6.8.01 12 22.42 N	CTD15	073	01:18	4		12									Calibration		
CTD15 GT3 1.4 4.86.0 1.2 I.A P282 2846 Wind happ Manual participation Manual participation CTD15 GT3 GT48 4.85.8 12 I.A I.A I.A Bit 18.16 I.A I.A Bit 18.16 I.A	CTD15	073	01:19	4	48.59	12	22.41				2782	2802			B#14		
CTD15 GT3 1.4 4.86.0 1.2 I.A P282 2846 Wind happ Manual participation Manual participation CTD15 GT3 GT48 4.85.8 12 I.A I.A I.A Bit 18.16 I.A I.A Bit 18.16 I.A	CTD15	073	01:34	4	48.59	12	22.42					2800					
CTD15 OT2 0.42 4 44.80 12 N N NS CTD15 073 0742 4 48.90 12 N <td< td=""><td>CTD15</td><td>073</td><td>01.37</td><td>4</td><td>48 60</td><td></td><td></td><td></td><td></td><td></td><td>2925</td><td>2946</td><td></td><td></td><td>winch stop</td><td></td><td></td></td<>	CTD15	073	01.37	4	48 60						2925	2946			winch stop		
CTOPS OTS OTS OTS A 48.95 1/2 N N N B F1.8 18 N N CTDIS 073 053 4 48.99 1/2 N N B 17.8 18 17.8 18 17.8 18 17.8 18 17.8 18 17.8 18 17.8 18 17.8 18 17.8 18 17.8 18 17.8 18 17.8 18 17.8 18 18.8 18 17.8 18 17.8 18 17.8 18 17.8 18 18.8 18 18.8 18 18.8 18 17.8 18 17.8 18 17.8 18 18.8 18 17.8 18 17.8 18 17.8 18 17.8 18 18.8 18 18.8 18 18.8 18 18.8 18 18.8 18 18.8 18 18.8 18 18.8 18 18.8 18 18.8 18 18.8 18 18.8 18 18.8 18 <											2020	2040					
CTD15 OT3 0.52 4 44.89 12 Image: Constraint of the state of th																	
CT015 G73 G73 G75 4 44.59 12 L L L Bart																	
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SAP 01 074 09:04 COSAP02 + MAPR @ 100M SAP 01 074 09:04 COSAP03 + MAPR @ 125M SAP 01 074 09:06 COSAP03 + MAPR @ 125M SAP 01 074 09:26 COSAP03 + MAPR @ 125M SAP 01 074 09:28 SAP 01 COSAP03 + MAPR @ 125M SAP 01 074 09:28 SAP 01 OT4 09:28 SAP 01 SAP 01 074 10:00 4 48.56 12 22.33 3057 934 SAP 01 OT4 Other 0 SAP 01 OT4 00:02 48.55 12 22.35 1805 10KHz off SAP 01 074 10:50 22.04 2120 SAPS cancelled - ABE ascending 2120 ABE133 074 13:55 4 49.80 12 22.04 ABE on deck 200 CTD17 074 14:45 4 48.30 12 22.04 Mathematical ascending 200 CTD17 074 14:45 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>																
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	Operation RC22 RC22 RC22 RC22 RC22 RC22 RC22 RE154 ABE154 CTD18 CTD18 <td>CD16 Jday 075 075 075 075 075 075 075 075 075 075</td> <td>33 Leg2 Time 04:31 05:28 06:00 06:30 06:51 07:12 07:13 07:15 07:12 07:13 07:15 07:12 07:13 07:12 07:13 07:12 07:13 07:15 08:26 08:28 08:26 08:29 08:34 08:37 08:49 08:56 08:56 08:56 09:50 09:51 09:53 10:30 11:03 11:05 11:05 11:05 11:05 11:05 11:05 11:05 11:05 11:05 1</td> <td>Lat. (Soc Deg Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4</td> <td>uth) Min 49.28 48.30 48.39 48.61 48.59 48.56 48.56 48.56 48.56 48.56 48.56 48.58</td> <td>Deg 12</td> <td>Min 21.89 22.70 22.56 22.45 22.39 22.43 22.43 22.43 22.42 22.42 22.42 22.42 22.41 22.41 22.41 22.41 22.42 22.42 22.42 22.42 22.42 22.42</td> <td>120 170 068 048 265 229</td> <td>0.5 1.8 1.2 0.3 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5</td> <td>2927 3012 3002 2984 2984 2985 2985 2985 2985 2985 2984 2984 2984</td> <td>Wire Out 2971 2 2 2 2925 2945 2945 2945 2945 2945 2945 2945 2925 2860 2885 2810 2735 2710 2500</td> <td>Depth 2475 2940 2959 2959 2951 2940 2920 2920 2920 2920 2875 2850 2825 2850 2825 2800 2775 2750 2775 2750 2751 2514</td> <td>Layback</td> <td>Altitude</td> <td>Comments </td> <td></td>	CD16 Jday 075 075 075 075 075 075 075 075 075 075	33 Leg2 Time 04:31 05:28 06:00 06:30 06:51 07:12 07:13 07:15 07:12 07:13 07:15 07:12 07:13 07:12 07:13 07:12 07:13 07:15 08:26 08:28 08:26 08:29 08:34 08:37 08:49 08:56 08:56 08:56 09:50 09:51 09:53 10:30 11:03 11:05 11:05 11:05 11:05 11:05 11:05 11:05 11:05 11:05 1	Lat. (Soc Deg Deg 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	uth) Min 49.28 48.30 48.39 48.61 48.59 48.56 48.56 48.56 48.56 48.56 48.56 48.58	Deg 12	Min 21.89 22.70 22.56 22.45 22.39 22.43 22.43 22.43 22.42 22.42 22.42 22.42 22.41 22.41 22.41 22.41 22.42 22.42 22.42 22.42 22.42 22.42	120 170 068 048 265 229	0.5 1.8 1.2 0.3 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	2927 3012 3002 2984 2984 2985 2985 2985 2985 2985 2984 2984 2984	Wire Out 2971 2 2 2 2925 2945 2945 2945 2945 2945 2945 2945 2925 2860 2885 2810 2735 2710 2500	Depth 2475 2940 2959 2959 2951 2940 2920 2920 2920 2920 2875 2850 2825 2850 2825 2800 2775 2750 2775 2750 2751 2514	Layback	Altitude	Comments		

ABE155	075	11:40	4	48.06	12	22.70			3010					On station ABE155	
ABE155	075	11:53												suspension of deployment 30/60mins - camera overheating	
ABE155	075	12:51	4	48.02	12	22.68	290	0.9	3025					ABE155 launched	
SAP 02	075		4	48.49	12	22.34			2980					On station for SAP 02	
			4	48.51	12	22.29			2967						
	075			40.51	12	22.29								Weight in water	
SAP 02	075		4						2985					Pinger in water	
SAP 02	075	13:47	4											SN0004 and MAPR12 in water	
SAP 02	075	13:53												SN0203 and MAPR8 in water	
SAP02	075													SN2002 and MAPR29 in water	
SAP02	075		4	48.48	12	22.34								SN005 and MAPR 9 in water	
										0700					
SAP02	075		4	48.53	12	22.33				2700			140	winch stop	
SAP02	075	15:55	4	48.53	12	22.32				2770				In position - weight at 50m	
SAO02	075	16:16	4	48.54	12	22.33								Pumps started	
SAP02	075	17:00	4	48.54	12	22.26	293	0.8							
SAP02	075		4	48.54	12	22.27	356	0.1		2770					
SAP02	075	-	4	48.51	12	22.35	325	0.1		2769					
SAP02	075		4	48.53	12	22.31	125	0.4		2769				pumps finished	
SAP02	075	18:26												winch haul @ 40m/m	
SAP02	075	19:50												MAPR & SAP 1 on deck	
SAP02	075								1					MAPR & SAP 2 on deck	
SAP02	075							t	1					MAPR & SAP 3 on deck	
SAP02	075							l	I					MAPR & SAP 4 on deck	
SAP02	075													pinger on deck	
SAP02	075	20:13				1	1	l –	1					weight on deck	
			: scienc	e loa											
		9-	Lat. (So		Long. ((West)			1	BRIDGET	Letc.				
Oneration	المامي	Time					CMG	SMC				Lauhaak	Altitude	Comments	
Operation			Deg	Min	Deg	Min	CIVIG	SING	Wat. dept	wire Out	Depth	Layback	Altitude		
transit	075	20:30												transit to BRIDGET03	
transit	075		4	47.03	12	23.95	345	4.0							
BGT03	075	21:30	4	44.85	12	24.62	044	1.7						manouvering on station	
BGT03	075	21:40	4	44.79	12	24.58	130	1.4						Deploying BRIDGET03	
BGT03	075		-											BRIDGET in water	
BGT03	075													BRIDGET recovery	
BGT03	075	22:15													
														BRIDGET on deck	
BGT03	075		4	44.97	12	24.44								BRIDGET on deck Hove-to	
		22:31	4	44.97 45.03	12 12	24.44 24.42									
BGT03 BGT03	075 075	22:31 23:00	4	45.03	12	24.42								Hove-to New start poss 1 mile down the line	
BGT03 BGT03 BGT03	075 075 075	22:31 23:00 23:58	4 4	45.03 45.77	12 12	24.42 23.83	120	0.0	2110	4200	4225	4511 IMI		Hove-to New start poss 1 mile down the line BRIDGET in water	
BGT03 BGT03 BGT03 BGT03	075 075 075 076	22:31 23:00 23:58 00:22	4 4 4	45.03 45.77 46.08	12 12 12	24.42 23.83 23.61	130	0.9	3110	1328	1335	#NUM!		Hove-to New start poss 1 mile down the line BRIDGET in water big ritt going down	
BGT03 BGT03 BGT03 BGT03 BGT03	075 075 075 076 076	22:31 23:00 23:58 00:22 01:00	4 4 4 4	45.03 45.77 46.08 46.18	12 12 12 12	24.42 23.83 23.61 23.63	130	1.1	3131	1840	1836	311		Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down	
BGT03 BGT03 BGT03 BGT03 BGT03 BGT03	075 075 075 076 076 076	22:31 23:00 23:58 00:22 01:00 01:30	4 4 4 4 4	45.03 45.77 46.08 46.18 46.44	12 12 12 12 12 12	24.42 23.83 23.61 23.63 23.38	130 131	1.1 1.1	3131 3087	1840 2733	1836 2715	311 503	212	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down Mn, eh signal, no nephs	
BGT03 BGT03 BGT03 BGT03 BGT03	075 075 075 076 076	22:31 23:00 23:58 00:22 01:00 01:30	4 4 4 4	45.03 45.77 46.08 46.18	12 12 12 12	24.42 23.83 23.61 23.63	130	1.1	3131	1840	1836	311	<u>212</u> 100	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down Mn, eh signal, no nephs	
BGT03 BGT03 BGT03 BGT03 BGT03 BGT03 BGT03	075 075 076 076 076 076	22:31 23:00 23:58 00:22 01:00 01:30 01:46	4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65	12 12 12 12 12 12 12	24.42 23.83 23.61 23.63 23.38 23.19	130 131 141	1.1 1.1 1.4	3131 3087 3135	1840 2733 2990	1836 2715 2980	311 503 434	100	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down Mn, eh signal, no nephs fire bottle 1- nephs plume	
BGT03 BGT03 BGT03 BGT03 BGT03 BGT03 BGT03 BGT03	075 075 076 076 076 076 076	22:31 23:00 23:58 00:22 01:00 01:30 01:46 02:00	4 4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65 46.78	12 12 12 12 12 12 12 12 12	24.42 23.83 23.61 23.63 23.38 23.19 23.12	130 131 141 140	1.1 1.1 1.4 1.2	3131 3087 3135 3068	1840 2733 2990 3013	1836 2715 2980 2937	311 503 434 862	100 75	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down Mn, eh signal, no nephs fire bottle 1- nephs plume fire bottle 2- nephs plume	
BGT03 BGT03 BGT03 BGT03 BGT03 BGT03 BGT03 BGT03 BGT03	075 075 076 076 076 076 076 076	22:31 23:00 23:58 00:22 01:00 01:30 01:46 02:00 02:05	4 4 4 4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65 46.78 46.83	12 12 12 12 12 12 12 12 12 12	24.42 23.83 23.61 23.63 23.38 23.19 23.12 23.08	130 131 141 140 140	1.1 1.1 1.4 1.2 1.3	3131 3087 3135 3068 3100	1840 2733 2990 3013 2996	1836 2715 2980 2937 2975	311 503 434 862 544	100 75 75	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down Mn, eh signal, no nephs fire bottle 1- nephs plume fire bottle 2- nephs plume fire bottle 3 - neph plume	
BGT03 BGT03 BGT03 BGT03 BGT03 BGT03 BGT03 BGT03 BGT03	075 075 076 076 076 076 076 076 076	22:31 23:00 23:58 00:22 01:00 01:30 01:46 02:00 02:05 02:19	4 4 4 4 4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65 46.78 46.83 46.99	12 12 12 12 12 12 12 12 12 12 12	24.42 23.83 23.61 23.63 23.38 23.19 23.12 23.08 22.96	130 131 141 140 140 140	1.1 1.1 1.4 1.2 1.3 1.2	3131 3087 3135 3068 3100 3096	1840 2733 2990 3013 2996 3188	1836 2715 2980 2937 2975 3010	311 503 434 862 544 1240	100 75 75 70	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down Mn, eh signal, no nephs fire bottle 1- nephs plume fire bottle 2- nephs plume fire bottle 3 - neph plume fire bottle 4 - nephs plume	
BGT03	075 075 076 076 076 076 076 076 076 076	22:31 23:00 23:58 00:22 01:00 01:30 01:46 02:00 02:05 02:19 02:24	4 4 4 4 4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65 46.78 46.83 46.99 #REF!	12 12 12 12 12 12 12 12 12 12 12 12	24.42 23.83 23.61 23.63 23.38 23.19 23.12 23.08 22.96 #REF!	130 131 141 140 140 140 140	1.1 1.1 1.4 1.2 1.3 1.2 1.3	3131 3087 3135 3068 3100 3096 3096	1840 2733 2990 3013 2996 3188 3148	1836 2715 2980 2937 2975 3010 3030	311 503 434 862 544 1240 1044	100 75 75 70 50	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down big rita going down Mn, eh signal, no nephs fire bottle 1- nephs plume fire bottle 2- nephs plume fire bottle 3 - neph plume fire bottle 3 - neph plume fire bottle 4 - nephs plume fire bottle 5 - nephs plume fire bottle 5 - nephs plume	
BGT03	075 075 076 076 076 076 076 076 076 076 076	22:31 23:00 23:58 00:22 01:00 01:30 01:46 02:00 02:05 02:19 02:24 02:30	4 4 4 4 4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65 46.78 46.83 46.99	12 12 12 12 12 12 12 12 12 12 12	24.42 23.83 23.61 23.63 23.38 23.19 23.12 23.08 22.96	130 131 141 140 140 140 140 140	1.1 1.1 1.4 1.2 1.3 1.2 1.3 1.3	3131 3087 3135 3068 3100 3096 3096 3095	1840 2733 2990 3013 2996 3188 3148 2974	1836 2715 2980 2937 2975 3010 3030 2819	311 503 434 862 544 1240 1044 1138	100 75 75 70 50 143	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down Mn, eh signal, no nephs fire bottle 1- nephs plume fire bottle 2- nephs plume fire bottle 3 - neph plume fire bottle 4 - nephs plume	
BGT03	075 075 076 076 076 076 076 076 076 076	22:31 23:00 23:58 00:22 01:00 01:30 01:46 02:00 02:05 02:19 02:24 02:30	4 4 4 4 4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65 46.78 46.83 46.99 #REF!	12 12 12 12 12 12 12 12 12 12 12 12	24.42 23.83 23.61 23.63 23.38 23.19 23.12 23.08 22.96 #REF!	130 131 141 140 140 140 140	1.1 1.1 1.4 1.2 1.3 1.2 1.3	3131 3087 3135 3068 3100 3096 3096	1840 2733 2990 3013 2996 3188 3148	1836 2715 2980 2937 2975 3010 3030	311 503 434 862 544 1240 1044	100 75 75 70 50	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down big rita going down Mn, eh signal, no nephs fire bottle 1- nephs plume fire bottle 2- nephs plume fire bottle 3 - neph plume fire bottle 3 - neph plume fire bottle 4 - nephs plume fire bottle 5 - nephs plume fire bottle 5 - nephs plume	
BGT03	075 075 076 076 076 076 076 076 076 076 076 076	22:31 23:00 23:58 00:22 01:00 01:30 01:46 02:00 02:05 02:19 02:24 02:30 02:38	4 4 4 4 4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65 46.78 46.83 46.99 #REF!	12 12 12 12 12 12 12 12 12 12 12 12	24.42 23.83 23.61 23.63 23.38 23.19 23.12 23.08 22.96 #REF!	130 131 141 140 140 140 140 140	1.1 1.1 1.4 1.2 1.3 1.2 1.3 1.3	3131 3087 3135 3068 3100 3096 3096 3095 3095	1840 2733 2990 3013 2996 3188 3148 2974 3120	1836 2715 2980 2937 2975 3010 3030 2819	311 503 434 862 544 1240 1044 1138 1206	100 75 75 70 50 143	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down Mn, eh signal, no nephs fire bottle 1 - nephs plume fire bottle 2 - nephs plume fire bottle 3 - neph plume fire bottle 4 - nephs plume fire bottle 5 - nephs plume fire bottle 6 - nephs plume fire bottle 7 - nephs + Mn plume	
BGT03	075 075 076 076 076 076 076 076 076 076 076 076	22:31 23:00 23:58 00:22 01:00 01:30 01:46 02:00 02:05 02:19 02:24 02:30 02:38 02:55	4 4 4 4 4 4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65 46.78 46.83 46.99 #REF! 47.20	12 12 12 12 12 12 12 12 12 12 12 12	24.42 23.83 23.61 23.63 23.38 23.19 23.12 23.08 22.96 #REF! 22.80	130 131 141 140 140 140 140 140 140	1.1 1.1 1.4 1.2 1.3 1.2 1.3 1.3 1.3	3131 3087 3135 3068 3100 3096 3096 3095 3095 3085	1840 2733 2990 3013 2996 3188 3148 2974 3120	1836 2715 2980 2937 2975 3010 3030 2819 2950 2937	311 503 434 862 544 1240 1044 1138 1206 1249	100 75 75 70 50 143 95 100	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down Mn, eh signal, no nephs fire bottle 1- nephs plume fire bottle 2- nephs plume fire bottle 4- nephs plume fire bottle 4- nephs plume fire bottle 5- nephs plume fire bottle 6- nephs plume fire bottle 6- nephs plume fire bottle 7- nephs plume fire bottle 7- nephs + Mn plume fire bottle 8 - neph + Mn plume	
BGT03	075 075 076 076 076 076 076 076 076 076 076 076	22:31 23:00 23:58 00:22 01:00 01:30 01:46 02:00 02:05 02:19 02:24 02:30 02:38 02:55 03:00	4 4 4 4 4 4 4 4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65 46.78 46.83 46.99 #REF! 47.20 47.60	12 12 12 12 12 12 12 12 12 12 12 12 12	24.42 23.83 23.61 23.63 23.38 23.19 23.12 23.08 22.96 #REF! 22.80 22.50	130 131 141 140 140 140 140 140 140 140 140 140 140 140 140 140 140	1.1 1.1 1.4 1.2 1.3 1.2 1.3 1.3 1.3 1.3 1.3	3131 3087 3135 3068 3100 3096 3095 3095 3095 3085 3042	1840 2733 2990 3013 2996 3188 3148 2974 3120 3122 3284	1836 2715 2980 2937 2975 3010 3030 2819 2950 2937 3081	311 503 434 862 544 1240 1044 1138 1206 1249 1327	100 75 75 50 143 95 100 27	Hove-to New start poss 1 mile down the line BRIDGET in water B big rita going down big rita going down big rita going down Min, eh signal, no nephs fire bottle 1 - nephs plume fire bottle 2 - nephs plume fire bottle 3 - neph plume fire bottle 4 - nephs plume fire bottle 4 - nephs plume fire bottle 5 - nephs plume fire bottle 5 - nephs plume fire bottle 6 - nephs plume fire bottle 6 - nephs + Mn plume fire bottle 7 - nephs + Mn plume fire bottle 8 - neph + Mn plume fire bottle 7 - neph plume	
BGT03	075 075 076 076 076 076 076 076 076 076 076 076	22:31 23:00 23:58 00:22 01:00 01:30 01:46 02:00 02:05 02:19 02:24 02:30 02:38 02:55 03:00 03:24	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65 46.78 46.83 46.99 #REF! 47.20 47.60 47.90	12 12 12 12 12 12 12 12 12 12 12 12 12 1	24.42 23.83 23.61 23.63 23.38 23.19 23.12 23.08 22.96 #REF! 22.80 22.50 22.30	130 131 141 140 140 140 140 140 140 140 140 14	1.1 1.1 1.4 1.2 1.3 1.3 1.3 1.3 1.3 1.3 1.3	3131 3087 3135 3068 3100 3096 3095 3095 3085 3085 3042 3006	1840 2733 2990 3013 2996 3188 3148 2974 3120 3122 3284 3180	1836 2715 2980 2937 2975 3010 3030 2819 2950 2937 3081 2966	311 503 434 862 544 1240 1044 1138 1206 1249 1327 1337	100 75 75 50 143 95 100 27 73	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down Mn, eh signal, no nephs fire bottle 1 - nephs plume fire bottle 2 - nephs plume fire bottle 3 - neph plume fire bottle 4 - nephs plume fire bottle 5 - nephs plume fire bottle 6 - nephs plume fire bottle 7 - nephs + Mn plume fire bottle 7 - nephs + Mn plume bottom of neph plume. Then started hauling at 40m/min	
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BGT03	075 075 076 076 076 076 076 076 076 076 076 076	22:31 23:00 23:58 00:22 01:00 01:30 01:46 02:00 02:05 02:19 02:24 02:38 02:55 03:00 03:24 03:34	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65 46.78 46.83 46.99 #REF! 47.20 47.60 47.90	12 12 12 12 12 12 12 12 12 12 12 12 12 1	24.42 23.83 23.61 23.63 23.38 23.19 23.12 23.08 22.96 #REF! 22.80 22.50 22.30	130 131 141 140 140 140 140 140 140 140 140 14	1.1 1.1 1.4 1.2 1.3 1.3 1.3 1.3 1.3 1.3 1.3	3131 3087 3135 3068 3100 3096 3095 3095 3085 3085 3042 3006	1840 2733 2990 3013 2996 3188 3148 2974 3120 3122 3284 3180	1836 2715 2980 2937 2975 3010 3030 2819 2950 2937 3081 2966	311 503 434 862 544 1240 1044 1138 1206 1249 1327 1337	100 75 75 50 143 95 100 27 73	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down Mn, eh signal, no nephs fire bottle 1 - nephs plume fire bottle 2 - nephs plume fire bottle 3 - neph plume fire bottle 4 - nephs plume fire bottle 5 - nephs plume fire bottle 6 - nephs plume fire bottle 7 - nephs + Mn plume fire bottle 7 - nephs + Mn plume bottom of neph plume. Then started hauling at 40m/min	
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BGT03	075 075 076 076 076 076 076 076 076 076 076 076	22:31 23:00 23:58 00:22 01:00 01:30 01:46 02:00 02:05 02:19 02:24 02:30 02:38 02:55 03:00 02:38 02:55 03:00 03:24 03:34 04:04 04:23	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65 46.78 46.83 46.83 46.83 46.99 #REF! 47.20 47.60 47.60 47.90 48.00	12 12 12 12 12 12 12 12 12 12 12 12 12 1	24.42 23.83 23.61 23.63 23.19 23.12 23.08 22.96 #REF! 22.80 22.50 22.30 22.20	130 131 141 140 140 140 140 140 140 140 140 14	1.1 1.1 1.4 1.2 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3	3131 3087 31087 3096 3096 3096 3095 3095 3085 3042 3006 2908	1840 2733 2990 3013 2996 3188 3148 2974 3120 3122 3284 3180 2800 1500	1836 2715 2980 2937 2975 3010 3030 2819 2950 2937 3081 2966	311 503 434 862 544 1240 1044 1138 1206 1249 1327 1337	100 75 75 50 143 95 100 27 73	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down Mn, eh signal, no nephs fire bottle 1 - nephs plume fire bottle 2 - nephs plume fire bottle 3 - neph plume fire bottle 4 - nephs plume fire bottle 5 - nephs plume fire bottle 6 - nephs plume fire bottle 7 - nephs + Mn plume fire bottle 7 - nephs + Mn plume bottom of neph plume. Then started hauling at 40m/min fire bottle 10 - 160m above plume top. Chem sensor switched off	
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BGT03	0755 0755 0766 0766 0766 0766 0766 0766	22:31 23:00 23:58 00:22 01:00 01:30 01:46 02:00 02:05 02:19 02:24 02:30 02:38 02:55 03:00 03:24 03:34 04:23 04:23 04:53	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65 46.78 46.83 46.99 #REF! 47.20 47.60 47.90 48.00	12 12 12 12 12 12 12 12 12 12 12 12 12 1	24.42 23.83 23.61 23.63 23.38 23.19 23.12 23.08 22.96 #REF! 22.80 22.50 22.30 22.20 22.30 22.20	130 131 141 140 140 140 140 140 140 140 140 14	1.1 1.1 1.4 1.2 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3	3131 3087 31087 3096 3096 3096 3095 3095 3085 3042 3006 2908	1840 2733 2990 3013 2996 3188 3148 2974 3120 3122 3284 3180 2800 1500	1836 2715 2980 2937 2975 3010 3030 2819 2950 2937 3081 2966	311 503 434 862 544 1240 1044 1138 1206 1249 1327 1337	100 75 75 50 143 95 100 27 73	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down m, eh signal, no nephs fire bottle 1 - nephs plume fire bottle 3 - neph plume fire bottle 4 - nephs plume fire bottle 5 - nephs plume fire bottle 6 - nephs plume fire bottle 7 - nephs + Mn plume fire bottle 8 - neph plume. fire bottle 9 - neph plume. fire bottle 9 - neph plume. fire bottle 9 - neph plume. fire bottle 1 - 160m above plume top. Chem sensor switched off BRIDGET on deck and secure	
BGT03 BGT03	0755 0755 0760 0760 0760 0760 0760 0760	22:31 23:00 23:58 00:22 01:00 01:30 01:46 02:00 02:05 02:19 02:24 02:30 02:38 02:55 03:00 03:24 03:34 04:23 04:23 04:23 04:23 04:23 04:23 05:12	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65 46.78 46.83 46.83 46.83 46.99 #REF! 47.20 47.60 47.60 47.90 48.00	12 12 12 12 12 12 12 12 12 12 12 12 12 1	24.42 23.83 23.61 23.63 23.19 23.12 23.08 22.96 #REF! 22.80 22.50 22.30 22.20	130 131 141 140 140 140 140 140 140 140 140 14	1.1 1.1 1.4 1.2 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3	3131 3087 31087 3096 3096 3096 3095 3095 3085 3042 3006 2908	1840 2733 2990 3013 2996 3188 3148 2974 3120 3122 3284 3180 2800 1500	1836 2715 2980 2937 2975 3010 3030 2819 2950 2937 3081 2966	311 503 434 862 544 1240 1044 1138 1206 1249 1327 1337	100 75 75 50 143 95 100 27 73	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down Mn, eh signal, no nephs fire bottle 1 - nephs plume fire bottle 2 - nephs plume fire bottle 4 - nephs plume fire bottle 6 - nephs plume fire bottle 7 - nephs plume fire bottle 8 - neph + Nm plume fire bottle 9 - neph s + Mn plume fire bottle 9 - neph plume. Then started hauling at 40m/min fire bottle 10 - 160m above plume top. Chem sensor switched off BRIDGET switched off BRIDGET switched off BRIDGET switched off BRIDGET is to ABErecovery	
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BGT03 BGT03	0755 0755 0760 0760 0760 0760 0760 0760	22:31 23:00 23:58 00:22 01:00 01:30 01:46 02:05 02:19 02:25 02:19 02:24 02:30 02:25 02:19 02:24 02:30 02:25 03:00 03:24 02:35 03:00 03:24 04:23 04:29 04:53 05:55	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65 46.78 46.83 46.99 #REF! 47.20 47.60 47.90 48.00	12 12 12 12 12 12 12 12 12 12 12 12 12 1	24.42 23.83 23.61 23.63 23.38 23.19 23.12 23.08 22.96 #REF! 22.80 22.50 22.30 22.20 22.30 22.20	130 131 141 140 140 140 140 140 140 140 140 14	1.1 1.1 1.4 1.2 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3	3131 3087 31087 3096 3096 3096 3095 3095 3085 3042 3006 2908	1840 2733 2990 3013 2996 3188 3148 2974 3120 3122 3284 3180 2800 1500	1836 2715 2980 2937 2975 3010 3030 2819 2950 2937 3081 2966	311 503 434 862 544 1240 1044 1138 1206 1249 1327 1337	100 75 75 50 143 95 100 27 73	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down Mn, eh signal, no nephs fire bottle 1 - nephs plume fire bottle 2 - nephs plume fire bottle 4 - nephs plume fire bottle 6 - nephs plume fire bottle 7 - nephs plume fire bottle 8 - neph + Nm plume fire bottle 9 - neph s + Mn plume fire bottle 9 - neph plume. Then started hauling at 40m/min fire bottle 10 - 160m above plume top. Chem sensor switched off BRIDGET switched off BRIDGET switched off BRIDGET switched off BRIDGET is to ABErecovery	
BGT03 HGT03 ABE	0755 0755 0760 0766 0766 0766 0766 0766	22:31 23:50 23:58 00:22 01:00 01:46 02:00 02:05 02:19 02:24 02:30 02:38 02:55 03:00 02:38 02:55 03:00 03:24 03:34 04:29 04:53 04:29 04:53 05:55 05:56	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65 46.78 46.83 46.99 #REF! 47.20 47.60 47.90 48.00	12 12 12 12 12 12 12 12 12 12 12 12 12 1	24.42 23.83 23.61 23.63 23.38 23.19 23.12 23.08 22.96 #REF! 22.80 22.50 22.30 22.20 22.30 22.20	130 131 141 140 140 140 140 140 140 140 140 14	1.1 1.1 1.4 1.2 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3	3131 3087 31087 3096 3096 3096 3095 3095 3085 3042 3006 2908	1840 2733 2990 3013 2996 3188 3148 2974 3120 3122 3284 3180 2800 1500	1836 2715 2980 2937 2975 3010 3030 2819 2950 2937 3081 2966	311 503 434 862 544 1240 1044 1138 1206 1249 1327 1337	100 75 75 50 143 95 100 27 73	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down m, eh signal, no nephs fire bottle 1 - nephs plume fire bottle 3 - neph plume fire bottle 4 - nephs plume fire bottle 5 - nephs plume fire bottle 6 - nephs plume fire bottle 7 - nephs + Mn plume fire bottle 9 - neph plume. Then started hauling at 40m/min fire bottle 10 - 160m above plume top. Chem sensor switched off BRIDGET on deck and secure In transit to ABErceovery ABE on surface Transponder B popped	
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BGT03 BGT03	0755 0750 0760 0760 0760 0760 0760 0760	22:31 23:00 01:22 01:00 01:30 02:02 02:01 02:02 02:19 02:24 02:30 02:24 02:30 02:24 02:30 02:24 02:30 02:24 02:30 02:24 02:30 02:24 02:30 02:24 02:30 02:24 02:30 02:24 02:35 02:25 03:00 02:24 02:35 03:26 02:20 02:24 02:35 02:25	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	45.03 45.77 46.08 46.18 46.44 46.65 46.78 46.83 46.83 46.99 #REF! 47.20 47.60 47.90 48.00	12 12 12 12 12 12 12 12 12 12 12 12 12 1	24.42 23.83 23.61 23.63 23.38 23.19 23.12 23.08 22.96 #REF! 22.80 22.50 22.30 22.20 22.30 22.20	130 131 141 140 140 140 140 140 140 140 140 14	1.1 1.1 1.4 1.2 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3	3131 3087 31087 3096 3096 3096 3095 3095 3085 3042 3006 2908	1840 2733 2990 3013 2996 3188 3148 2974 3120 3122 3284 3180 2800 1500	1836 2715 2980 2937 2975 3010 3030 2819 2950 2937 3081 2966	311 503 434 862 544 1240 1044 1138 1206 1249 1327 1337	100 75 75 50 143 95 100 27 73	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down Mn, eh signal, no nephs fire bottle 1 - nephs plume fire bottle 2 - nephs plume fire bottle 3 - neph plume fire bottle 4 - nephs plume fire bottle 5 - nephs plume fire bottle 7 - nephs plume fire bottle 7 - nephs hume fire bottle 8 - neph + Mn plume bottom of neph plume. Then started hauling at 40m/min fire bottle 10 - 160m above plume top. Chem sensor switched off BRIDGET switched off BRIDGET on deck and secure In transit to ABEreovery ABE on surface Transponder B spotted	
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BGT03 Cransit ABE ABE ABE ABE ABE ABE ABE ABE ABE ABE	075 075 075 076 076 076 076 076 076 076 076 076 076	22.311 23.00 01.20 01.30 01.40 02.00 00.00 02.00 00.000 00.000 00.000000	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	45.03 46.77 46.08 46.18 46.48 46.65 46.78 46.83 46.99 #REFI 47.20 47.60 48.00 48.00 48.55 48.30	12 12 12 12 12 12 12 12 12 12 12 12 12 1	24.42 23.83 23.61 23.63 23.38 23.19 23.12 23.08 22.96 #REF! 22.80 22.50 22.20 22.20 22.725	130 131 141 140 140 140 140 140 140 140 140 14	1.1 1.1 1.4 1.2 1.3 1.2 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.2	3131 3087 31087 3096 3096 3096 3095 3095 3085 3042 3006 2908	1840 2733 2990 3013 2996 3188 3148 2974 3120 3122 3284 3180 2800 1500	1836 2715 2980 2937 2975 3010 3030 2819 2950 2937 3081 2966	311 503 434 862 544 1240 1044 1138 1206 1249 1327 1337	100 75 75 50 143 95 100 27 73	Hove-to New start poss 1 mile down the line BRIDGET in water big rita going down big rita going down big rita going down big rita going down fire bottle 1 - nephs plume fire bottle 3 - neph plume fire bottle 4 - nephs plume fire bottle 6 - nephs plume fire bottle 6 - nephs plume fire bottle 7 - nephs + Mn plume fire bottle 9 - neph plume. Then started hauling at 40m/min fire bottle 9 - neph plume. Then started hauling at 40m/min fire bottle 9 - neph plume. Then started hauling at 40m/min fire bottle 10 - 160m above plume top. Chem sensor switched off BRIDGET switched off BRIDGET on deck and secure In transit to ABErecovery ABE on surface Transponder B popped ABE on deck Transponder B on deck USBL recovery start Transponder D on deck USBL recovery start Transponder D on deck USBL recovery start Transponder D on deck USBL recovery start Transponder A on deck	
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Appendix C: CD169 Science Log Leg 2

				E	END OF SC	CIENCE F	OR CD 1			
	08:50								Disemabarked science party, Ascension.	

Time	Date	J day	Lat		Lon		EM12 Line	CMG	SMG	Water	SVP	Comments
(GMT)	10.000.000	50	10				No.		10.0	Depth		
11:32	19/02/2005	50	10	34.21	-21	2.2	1		10.9			started logging/no SVP/no gyro
11:40	19/02/2005	50					1					gyro on
12:00	19/02/2005	50					1					slowed down to do 360 turn to empty sewer pipres
12:36	19/02/2005	50	10	28.65	-21	0.76	2	141	9	5159		finished flushing
17:37	19/02/2005	50	9	45.48	-20	30.48	3	147	11.12	4947		
23:05	19/02/2005	50	8	57.78	-19	59.32	4	143	11	3438		data deterioation - no SVP
08:56	20/02/2005	51	7	29.32	-19	2.11	5	142	11	4490		
15:03	20/02/2005	51	6	34.56	-18	26.96	6	148	11	4881		
22:01	20/02/2005	51	5	33.25	-17	47.53	7	146	11	5009		
09:19	21/02/2005	52	3	58.73	-16	46.7	8	146	10.6	4986		
14:48	21/02/2005	52	3	12.72	-16	17.2	9	150	10.8	4899		
20:04	21/02/2005	52	2	29.39	-15	51.5	10	150	9.6	5000		
08:16	22/02/2005	53	1	00.05	-14	59.67	11	146	10.3	3926		
14:52	22/02/2005	53	0	11.05	-14	31.3	12	141	10.7	3314		
16:23	22/02/2005	53										crossed the equator
09:01	23/02/2005	54	-2	00.33	-12	54.91	13	140	10.3	3941		
10:22	23/02/2005	54	-2	9.25	-12	48.53		140	10.6	3277		log off to apply SVP - derived from JR65 XBT
10:35	23/02/2005	54	-2	10.71	-12	47.47	14	140	10.3	2840	1	
17:37	23/02/2005	54	-2	55.98	-12	14.12	15	153	10.5	1881	1	at WP2 - start of work
19:37	23/02/2005	54	-3	13.48	-12	12.79	16	164	9.9	3907	1	at WP3
21:30	23/02/2005	54	-3	29.48	-12	10.27	17	162	10	3620	1	line no. change
00:02	24/02/2005	55	-3	52.23	-12	6.84	18	168	9.8	3688	1	at WP4
01:59	24/02/2005	55	-4	6.31	-12	17.91	19	176	9	3569	1	at WP5
04:11	24/02/2005	55	-4	25.39	-12	16.36	20	178	9.4	3528	1	at WP6
06:00	24/02/2005	55	-4	37.43	-12	26.94	20	157	8.6	3287	1	at WP7
06:25	24/02/2005	55	-4	40.9	-12	26.09	21	157	9.4	3300	1	change course, 15deg port
00.25	24/02/2005	55	-4	48.35	-12	21.8	22	132	9.4	2947	1	change course
10:04	24/02/2005	55	-4	8.43	-12	18.39	23	155	8.7	3454	1	end of swath survey - TOBI deployment
13:02	24/02/2005	55	-5	11.69	-12	17.55	24	135	3.7	3345	1	start TOBI survey 01
19:28	24/02/2005	55	-4	58.37	-12	20.35	25	14	2.5	3591	1	start TOBI sulvey 01
00:08	25/02/2005	56	-4	49.56	-12	20.33	20	10	2.5	3008	1	
07:30	25/02/2005	56	-4	34.57	-12	24.3	28	55	3.4	3726	1	
21:10	25/02/2005	56	-4 -4	4.56	-12	16.33	28	61	2.9	3935	1	
07:34	26/02/2005	57	-4	56.29	-12	4.73	29	126	0.8	3477	1	log off - TOBI recovery
07:34	26/02/2005	57	-3	56.92	-12	5.27	30	226	8.5	3487	1	transit to CTD01
08:22	26/02/2003	57	-3	4.33	-12	15.99	50	192	3.8	4050	1	log off at CTD01
	26/02/2005				-12	13.99	31	25	9.7	3207	1	transit to TOBI 02 - re-deployment
19:11 20:00	26/02/2005	57 57	-4 -4	10.56 5.64	-12	17.97	31	105	9.7	3207	1	
						19.48	32	105			1	hove-to for deployment
14:40	27/02/2005	58	-4	6.52	-12		-	-	2.7	3731	1	TOBI survey 02
07:31	28/02/2005	59	-3	33.25	-12	9.18	33	24	2.5	3678	1	Les off TODI
14:59	28/02/2005	59	-3	17.97	-12	10.19		5	2.5	3693	1	log off - TOBI recovery
18:35	28/02/2005	59	-3	15.07	-12	9.34	34	167	4.7	2988	1	log on - Transit to TOBI03
08:10	01/03/2005	60	-4	55.06	-11	38.65		154	5	3420		log off - TOBI deployment
10:27	01/03/2005	60	-4	57.08	-11	38.03	35	138	2.7	4464	1	lon og - TOBI03 survey
08:48	02/03/2005	61	-5	46.78	-11	30.58	36	160	3.3	3703	1	
16:36	02/03/2005	61	-6	4.38	-11	26.47	37	153	3.2	2970	1	
00:15	03/03/2005	62	-6	21.33	-11	21.47	38	144	3	3407	1	
06:52	03/03/2005	62										Ship lost power
08:02	03/03/2005	62	-6	38.97	-11	16.32	39					EM12 started
08:07	03/03/2005	62	-6	39.14	-11	16.27	39			3933		data flowing
09:38	03/03/2005	62	-6	42.14	-11	15.5	40			3292		logging resumed

09:51 09:55	03/03/2005	62										
	03/03/2005	62	-6	43	-11	15.3	41			3263		stop logging - mermaid re-boot started logging
10:08	03/03/2005	62	-0	45	-11	15.5	41			5205		trouble shooting
10:08	03/03/2005	62					45					stopped
		-		44	11	11.15				20.00		
10:19	03/03/2005	62	-6	44	-11	11.15	44			3060		CD169LEG2 START (FOR LOGGING PURPOSES ONLY)
12:59	03/03/2005	62	_									log-off TOBI recovery
Time	Date	J day	Lat		Lon		EM12 Line	CMG	SMG	Water	SVP	Comments
(GMT)							No.			Depth		
14:11	03/03/2005	62	-6	50.34	-11	14.47	45	245	9.2	4026	1	transit to Ascension
14:47	03/03/2005	62					46					changed transmit mode to deep
15:22	03/03/2005	62					47					changed transmit mode to Auto
09:26	04/03/2005	63	-7	54.58	-14	25.05		191	12.3	57		log-off - At Ascension
15:00	04/03/2005	63										Re-boot EM12 - data since power failure no good
16:55	04/03/2005	63					48					sacrificed line 48 for re-start
17:22	04/03/2005	63	-7	54.25	-14	26.11	49	81	9.3	75		log-on - leg 2
18:35	04/03/2005	63	-7	44.48	-14	19.47	50	29	11.4	2944		
07:29	05/03/2005	64	-6	6.33	-13	14.93	50	2/		3459		stop logging - at CTD03
10:15	05/03/2005	64	-6	6.79	-13	14.07	51	56	4.8	3449	1	transit to CTD04
13:15	05/03/2005	64	-5	41.97	-13	0.05	51	50	4.0	3395	1	log-off - At CTD04
14:25	05/03/2005	64	-5	41.77	-13	0.05	52			3395	1	line 52 sacrified - EM12 settings alterations
	05/03/2005						32					· · · · · · · · · · · · · · · · · · ·
14:47		64	5	41.70	12	50.40	52	22	11	2201	1	log-off
18:04	05/03/2005	64	-5	41.79	-12	58.48	53	33	11	3391	1	Transit to Segment2
00:09	06/03/2005	65	-5	6.88	-12	19.2				3425		log-off at RC05
02:00	06/03/2005	65					55					log-on for RC05
06:05	06/03/2005	65	-5	3.63	-12	18.135	56	334	10.2	3538	1	line change - start transit to WP29 (west seg 2)
08:17	06/03/2005	65	-4	44.18	-12	28	57	132	8.3	3025	1	A/C - transit to transponder station
10:12	06/03/2005	65										log-off - line 57 mostly waste
12:41	07/03/2005	66					58				1	log on for DUM01.
18:26	07/03/2005	66	-4	45.38	-12	27.94	60	89	3	2865	1	change line no. line 59 not used, confusion !!!
07:33	08/03/2005	67	-4	46.79	-12	23.37						lof off for RC07
15:45	08/03/2005	67										EM12 shut down - interferance with ABE
05:00	11/03/2005	70	-4	39.13	-12	24.71	61					logging on. Transit to ABE02
												lines 61 to 69 useless. Problems with time difference
												between internal clock and input time from DGPS.
17:10	11/03/2005	70	-4	47.5	-12	23.21	70	119	1.4	3080	1	Log on
19:54	11/03/2005	70	-4	44.26	-12	23.23	71	154	1.5	3352	1	Rock dredge 02
00:01	12/03/2005	71	-4	44.87	-12	21.94	/1	129	1.3	3270	1	log off
06:38	13/03/2005	72	-4	48.91	-12	22.95	72	135	1.7	2971	1	log on - start swath survey - WP45
08:29	13/03/2005	72	-4	58.96	-12	14.84	12	151	2.9	2695	1	log off - CTD test dip - changed beam angle to 120 from 105
08:29	13/03/2005	72	-4	59.09	-12	14.84	73	151	2.7	2075	1	log on
10:12	13/03/2005	72	-4 -5	7.86	-12	14.82	73	133	8.8	3755	1	AC wp 46
10:12		72	-5	7.86 8.17	-12	12.1	/4	155	0.0	5133	1	1
	13/03/2005						75	125	1	2766	1	log off CTD test dip
11:25	13/03/2005	72	-5	8.16	-12	11.66	75	125	1	3766	1	resume swath survey
11:59	13/03/2005	72	-5	6.63	-12	8.16	76	340	9.5	4042	1	AC at WP47
13:57	13/03/2005	72	-4	49.11	-12	13.51	77	343	9.5	2258	1	
15:26	13/03/2005	72	-4	36.25	-12	18.57	78	254	9.4	2147	1	
16:56	13/03/2005	72	-4	40.11	-12	32.39	79	204	8.24	2871	1	
18:06	13/03/2005	72	-4	49.82	-12	33.22	80	126	7.4	2632	1	AC - end swath survey - transit to CTD
19:20	13/03/2005	72	-4	48.53	-12	23.22		97	5	3001	1	log off - at CTD station
	14/03/2005	73					81				1	log on for ? - log not completed
09:39	14/03/2005	73	-4	48.16	-12	22.53						log off.
00.55	17/03/2005	76	-4	48.99	-12	23.34	82	120	5.4	3022	1	Log on for transit to Ascension
09:20	17/05/2005								8.9			

Appendix D: Swath Survey Data List

15:12	17/03/2005	76	-5	38.63	-12	49.85	84	207	8.9	3312	1	
18:15	17/03/2005	76	-6	4.01	-13	7.51	85	207	8.9	3396		

Appendix E: CTD Configuration Files for CD 169

D.1) Original Configuration File

Date: 03/16/2005 ASCII file: C:\Program Files\Sea-Bird\Seasave-Win32\CD169\CD169_main.con Configuration report for SBE 911/917 plus CTD _____ Frequency channels suppressed : 0 Voltage words suppressed : 0 Computer interface : RS-232C Scans to average : 1 Surface PAR voltage added : No NMEA position data added : Yes : Yes Scan time added 1) Frequency, Temperature Serial number : 4489 Calibrated on : 12/29/04 : 4.36985005e-003 G Н : 6.45644119e-004 I : 2.27228210e-005 J : 1.99064966e-006 F0 : 1000.000 F0: 1000.000Slope: 1.0000000Offset: 0.0000 2) Frequency, Conductivity Serial number : 3052 Calibrated on : 12/30/04 : -1.01167697e+001 G : 1.41046907e+000 Η : 1.40888638e-004 Ι J : 6.06099170e-005 CTcor : 3.2500e-006 CPcor : -9.57000000e-008 Slope : 1.0000000 Offset : 0.00000 Offset : 0.00000 3) Frequency, Pressure, Digiquartz with TC Serial number : 73299 Calibrated on : 8 may 2002 C1 : -5.087539e+004 C2 : -2.199664e-002 C3 : 1.589010e-002 D1 : 3.721700e-002 : 0.000000e+000 D2 Т1 : 3.011152e+001 : -2.857091e-004 : 4.528990e-006 т2 Т3 т4 : -5.484500e-011 т5 : 0.000000e+000

 Slope
 : 0.00000000

 Offset
 : 0.00000

 AD590M
 : 1.282874e-002

 AD590B
 : -9.075593e+000

4) Frequency, Temperature, 2 Serial number : 4490 Calibrated on : 12/28/04 : 4.40572536e-003 G : 6.48538846e-004 Η : 2.30142379e-005 I : 2.02318152e-006 J : 1000.000 F0 Slope : 1.0000000 Offset : 0.0000 5) Frequency, Conductivity, 2 Serial number : 3054 Calibrated on : 12/22/04G : -9.90666069e+000 Η : 1.36319852e+000 Ι : -2.43252028e-004 J : 8.05596827e-005 : 3.2500e-006 CTcor CPcor : -9.5700000e-008 : 1.00000000 Slope Offset : 0.00000 6) A/D voltage 0, Oxygen, SBE 43 Serial number : 0709 Calibrated on : 6 aug 2004 Soc : 3.8260e-001 Boc : 0.0000 Offset : -0.4858 : 0.0010 Tcor : 1.35e-004 Pcor : 0.0 Tau 7) A/D voltage 1, Free 8) A/D voltage 2, Altimeter Serial number : Calibrated on : Scale factor : 1.000 Offset : 0.000 9) A/D voltage 3, Fluorometer, Chelsea Aqua 3 Serial number : 88/2360/108 Calibrated on : 17 nov 2004 : 0.287100 VB : 1.978300 V1 Vacetone : 0.331500 Scale factor : 1.000000
 Slope
 : 1.000000

 Offset
 : 0.000000
 10) A/D voltage 4, OBS, Seapoint Turbidity Serial number : 10491 Calibrated on : 1 june 2004 Gain setting : 100 x Scale factor : 1.000

11) A/D voltage 5, Free

```
12) A/D voltage 6, User Polynomial
   Serial number : 169
   Calibrated on : 9 nov 04
   Sensor name :
        : 0.00021513
: 0.00300000
   A0
   A1
                 : 0.0000000
   Α2
   Α3
                 : 0.0000000
13) A/D voltage 7, Transmissometer, Chelsea/Seatech/Wetlab CStar
   Serial number : 161/2642/002
   Calibrated on : 4 sept 1996
       : 20.0000
   М
   в
                 : 0.0000
   Path length : 0.250
```

D.2) Configuration File after Deck Unit Swap, Cast 006.

Date: 03/16/2005 ASCII file: C:\Program Files\Sea-Bird\Seasave-Win32\CD169\CD169_main_SHIFT.con Configuration report for SBE 911/917 plus CTD _____ Frequency channels suppressed : 0 Voltage words suppressed : 0 Computer interface : RS-232C : 1 Scans to average Surface PAR voltage added : No NMEA position data added : No Scan time added : Yes 1) Frequency, Temperature Serial number : 4489 Calibrated on : 12/29/04 G : 4.36985005e-003 Н : 6.45644119e-004 I : 2.27228210e-005 : 1.99064966e-006 J FO : 1000.000 : 1.0000000 Slope : 0.0000 Offset 2) Frequency, Conductivity Serial number : 3052 Calibrated on : 12/30/04 G : -1.01167697e+001 Н : 1.41046907e+000 Ι : 1.40888638e-004 J : 6.06099170e-005 CTcor : 3.2500e-006 CPcor : -9.57000000e-008 Slope : 1.00000000 Offset : 0.00000

3) Frequency, Pressure, Digiquartz with TC

Serial number	:	73299
Calibrated on	:	8 may 2002
C1	:	-5.087539e+004
C2	:	-2.199664e-002
C3	:	1.589010e-002
D1	:	3.721700e-002
D2	:	0.000000e+000
T1	:	3.011152e+001
Т2	:	-2.857091e-004
Т3	:	4.528990e-006
Т4	:	-5.484500e-011
Т5	:	0.000000e+000
Slope	:	1.0000000
Offset	:	0.00000
AD590M	:	1.282874e-002
AD590B	:	-9.075593e+000

4)	Frequency, Tem	npe	erature, 2
	Serial number	:	4490
	Calibrated on	:	12/28/04
	G	:	4.40572536e-003
	Н	:	6.48538846e-004
	I	:	2.30142379e-005
	J	:	2.02318152e-006
	FO	:	1000.000
	Slope	:	1.0000000
	Offset	:	0.0000

5)	Frequency, Conductivity, 2					
	Serial number	:	3054			
	Calibrated on	:	12/22/04			
	G	:	-9.90666069e+000			
	Н	:	1.36319852e+000			
	I	:	-2.43252028e-004			
	J	:	8.05596827e-005			
	CTcor	:	3.2500e-006			
	CPcor	:	-9.5700000e-008			
	Slope	:	1.0000000			
	Offset	:	0.00000			

e 0, Oxygen, SBE 43
ber : 0709
on : 6 aug 2004
: 3.8260e-001
: 0.0000
: -0.4858
: 0.0010
: 1.35e-004
: 0.0

7) A/D voltage 1, Free

8) A/D voltage 2,	, User Polynomial
Serial number	: 169
Calibrated on	: 11/04
Sensor name	: BBRTD
AO	: 0.0000000
Al	: 1.0000000
A2	: 0.0000000

9) A/D voltage 3, Fluorometer, Chelsea Aqua 3 Serial number : 88/2360/108 Calibrated on : 17 nov 2004 : 0.287100 VB : 1.978300 V1 Vacetone : 0.331500 Scale factor : 1.000000 Slope : 1.000000 : 0.000000 Offset 10) A/D voltage 4, OBS, Seapoint Turbidity Serial number : 10491 Calibrated on : 1 june 2004 Gain setting : 100 x Scale factor : 1.000 11) A/D voltage 5, Free 12) A/D voltage 6, Free 13) A/D voltage 7, Transmissometer, Chelsea/Seatech/Wetlab CStar Serial number : 161/2642/002 Calibrated on : 4 sept 1996 : 20.0000 М : 0.0000 В Path length : 0.250

D.3) Configuration File after Sensor Re-Configuration, Cast 010.

Date: 03/16/2005

A3

ASCII file: C:\Program Files\Sea-Bird\Seasave-Win32\CD169\CD169_main_SHIFT.con

: 0.0000000

Configuration report for SBE 911/917 plus CTD

_ , , , ,		•
Frequency channels suppressed	:	0
Voltage words suppressed	:	0
Computer interface	:	RS-232C
Scans to average	:	1
Surface PAR voltage added	:	No
NMEA position data added	:	No
Scan time added	:	Yes

1)	Frequency, Ten	npe	erature
	Serial number	:	4489
	Calibrated on	:	12/29/04
	G	:	4.36985005e-003
	H	:	6.45644119e-004
	I	:	2.27228210e-005
	J	:	1.99064966e-006
	FO	:	1000.000
	Slope	:	1.0000000
	Offset	:	0.0000

2) Frequency, Conductivity Serial number : 3052 Calibrated on : 12/30/04 G : -1.01167697e+001 : 1.41046907e+000 Η : 1.40888638e-004 Ι J : 6.06099170e-005 CTcor : 3.2500e-006 : -9.57000000e-008 CPcor : 1.00000000 Slope : 0.00000 Offset 3) Frequency, Pressure, Digiquartz with TC Serial number : 73299 Calibrated on : 8 may 2002 C1 : -5.087539e+004 C2 : -2.199664e-002 C3 : 1.589010e-002 D1 : 3.721700e-002 D2 : 0.000000e+000 т1 : 3.011152e+001 : -2.857091e-004 т2 тЗ : 4.528990e-006 т4 : -5.484500e-011 т5 : 0.000000e+000 Slope : 1.00000000 : 0.00000 Offset AD590M : 1.282874e-002 AD590B : -9.075593e+000 4) Frequency, Temperature, 2 Serial number : 4490 Calibrated on : 12/28/04 : 4.40572536e-003 G Η : 6.48538846e-004 Ι : 2.30142379e-005 J : 2.02318152e-006 FO : 1000.000 Slope : 1.00000000 Offset : 0.0000 5) Frequency, Conductivity, 2 Serial number : 3054 Calibrated on : 12/22/04 : -9,90666069e+000 G : 1.36319852e+000 Н Ι : -2.43252028e-004 : 8.05596827e-005 J : 3.2500e-006 CTcor : -9.57000000e-008 CPcor Slope : 1.00000000 Offset : 0.00000 6) A/D voltage 0, Oxygen, SBE 43 Serial number : 0709 Calibrated on : 6 aug 2004 : 3.8260e-001 Soc Boc : 0.0000 Offset : -0.4858

```
: 0.0010
   Tcor
                : 1.35e-004
   Pcor
                : 0.0
   Tau
7) A/D voltage 1, Free
8) A/D voltage 2, User Polynomial
   Serial number : 169
  Calibrated on : 11/04
  Sensor name : BBRTD
A0 : 0.0000000
                : 1.0000000
  A1
  A2
                 : 0.0000000
  A3
                : 0.0000000
9) A/D voltage 3, Fluorometer, Chelsea Aqua 3
   Serial number : 88/2360/108
  Calibrated on : 17 nov 2004
  VB
                : 0.287100
  V1
                 : 1.978300
  Vacetone
                : 0.331500
   Scale factor : 1.000000
  Slope : 1.000000
Offset : 0.000000
  Offset
                : 0.000000
10) A/D voltage 4, OBS, Seapoint Turbidity
   Serial number : 10491
   Calibrated on : 1 june 2004
   Gain setting : 100 x
   Scale factor : 1.000
11) A/D voltage 5, Free
12) A/D voltage 6, Free
13) A/D voltage 7, Transmissometer, Chelsea/Seatech/Wetlab CStar
   Serial number : 161/2642/002
   Calibrated on : 4 sept 1996
   М
                 : 20.0000
   В
                 : 0.0000
   Path length : 0.250
```

Appendix F: Rock Sampling Stations

CD169 Rock Sample Stations and descriptions

Station	Target	La	t. (S)	Long	. (W)	Depth	Wire	Rock	Sediment
		0		0		m	m	grammes, type, crystallinity	type
RC01	Central seg. 3: volcano	4	11.31	12	18.05	3131	3235	1g altered glass	calcarious
RC02	North Seg. 3 hummock	4	6.00	12	18.10	3550	3689	none	yellow calc.
RC03	Mid-north Seg. 3 volcano	4	8.75	12	18.10	3350	3470	5g glass	calcarious
RC04	Central Seg. 3 sheet flow	4	13.00	12	17.18	2900	3032	12g glass	calcarious
RC05	South Seg. 2: volcano	5	6.88	12	19.19	3362	3464	0.1g of glass	calcarious
RC06	Mid-south Seg. 2: volcano	5	4.02	12	17.29	3599	3573	10g glass	calcarious
RC07	Centre Seg. 2, plume max. (Mexican's Hat)	4	46.84	12	23.24	3129	3129	8g glass, 0.5g sulphide	Fe-oxides
RC08	Centre Seg. 2, mottled valley in sheet flow	4	46.24	12	22.62	3145	3231	4g glass	Fe-oxides
RC09	Centre Seg. 2, hummocks NE of central sheet flow Central Seg. 2: speckeled area (on TOBI image), eastside sheet	4	48.89	12	22.91	2959	3080	3g plf glass	calcarious
RC10	flow	4	47.67	12	22.00	3010	3080	12g v-fresh glass	none
RC11	South central Seg. 2, southside sheet flow	4	50.97	12	22.25	3025	3153	10g plphyric glass	Fe-oxides
RC12	Central-northern Seg. 2: hummocky volcano	4	46.00	12	23.70	3175	3190	5g alt. glass	Fe-oxides
RC13	Central westside Seg. 2: hummocky ridge	4	47.45	12	24.60	2900	3080	10g glass	Fe-oxides
RC14	Central westside Seg. 2: hummocky ridge	4	49.60	12	24.05	2910	2980	.1g glass	calcarious
RC15	Centre Seg. 2, southwest side of sheet flow	4	50.24	12	23.20	3100	3180	0.1g of glass	calcarious
RC16	Central-east flank Seg. 2, seamount	4	48.48	12	21.25	2911	2998	2g alt. glass	calcarious
RC17	Centre Seg. 2, collapse pits in sheet flow and Eh hotspot Central Seg. 2: mound central north side of sheet flow Parson's	4	48.65	12	22.65	2988	3054	20g v-fresh glass	none
RC18	Nose)	4	47.77	12	22.47	2980	3020	5g v-fresh glass	Fe-oxides
RC19	Central Seg. 2: Central-northside of sheet flow	4	48.07	12	22.61	2990	3020	20g v-fresh glass	none
RC20	Central Seg. 2, mound just north of centre of sheet flow	4	47.30	12	22.80	2970	3012	3g plphyric alt. glass	none
RC21	Central Seg. 2, south-middle of sheet flow Central Seg. 2, hummocky ridge within south-middle of sheet	4	50.19	12	21.98	3010	1050	50g v-fresh glass	none
RC22	flow	4	49.28	12	21.90	2960	3015	3g plphyric alt. glass	Fe-oxides
DR01	North Seg. 2 hummocky ridge and volcano	4	38.27	12	25.46	3686		250kg mixed plag-phyric basalt	calcarious
01-end		4	39.08	24.7	23.41	3481			
DR02	Mid-north Seg. 2 hummocky AVR	4	44.33	12	23.41	3288		50kg mixed plag-phyric basalt	calcarious
02-end		4	45.05	12	21.83	3238			
								150kg of mixed sheet flow and	calc &
DR03	Central Seg. 2, below TOBI plume max. (Mexican's Hat)	4	46.37	12	23.12	3000		pillows	FeOx
03-end		4	47.02	12	22.84	3100	3400		
	Orgeters Com, O. Demografic Name to collisions with the start of		47 / 4	10	00.70	2020		200kg of glassy sheet and pillow	calc &
DR04 04-end	Centre Seg. 2, Parson's Nose to collapse pits: sheet flow area	4	47.64	12	22.70	3020		flows	FeOx