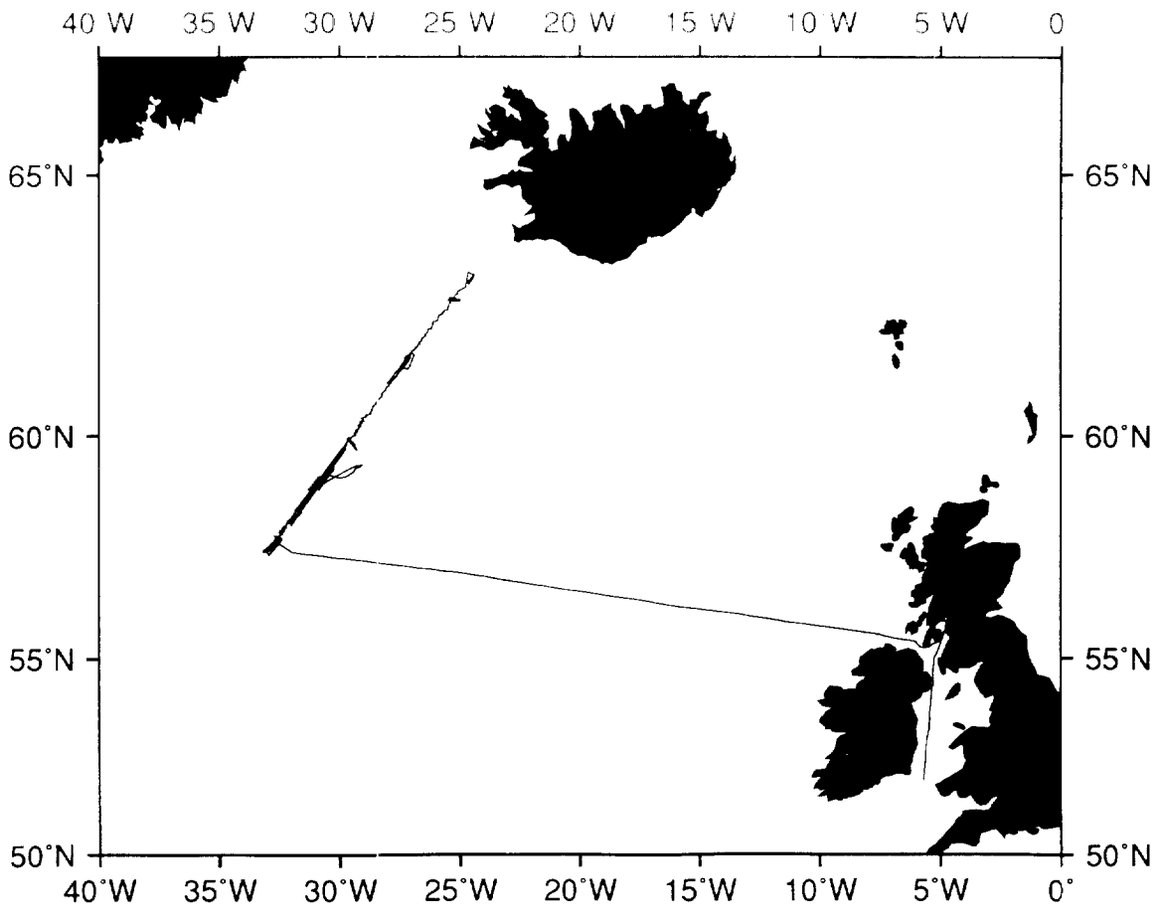
Institute of
Oceanographic Sciences
Deacon Laboratory

RRS *Charles Darwin* Cruise CD80

01 Sep - 01 Oct 1993

The PETROS Programme
(PETRogenesis of Oblique Spreading)

Cruise Report No 241 1995



INSTITUTE OF OCEANOGRAPHIC SCIENCES

DEACON LABORATORY

Wormley, Godalming,
Surrey, GU8 5UB, U.K.

Telephone: 0428 79 4141
Telex: 858833 OCEANS G
Telefax: 0428 79 3066

Director: Dr. C.P. Summerhayes

Natural Environment Research Council

INSTITUTE OF OCEANOGRAPHIC SCIENCES

DEACON LABORATORY

CRUISE REPORT NO. 241

RRS *CHARLES DARWIN* CRUISE CD80
01 SEP - 01 OCT 1993

The PETROS Programme
(PETRogenesis of Oblique Spreading)

Principal Scientist
B J Murton

1995

DOCUMENT DATA SHEET

AUTHOR	*PUBLICATION DATE*
MURTON, B.J. et al	1995

TITLE

RRS *Charles Darwin* Cruise CD80, 01 Sep-01 Oct 1993. The PETROS Programme (PETRogenesis of Oblique Spreading).

REFERENCE

Institute of Oceanographic Sciences Deacon Laboratory, Cruise Report, No. 241, 77pp.

ABSTRACT

High-frequency geological sampling, and swath sonar bathymetry sounding, of the Reykjanes Ridge between 57°N and 63°N; the northeast Atlantic Ocean. A rock sampling and bathymetric sounding survey along the medium-slow spreading plate boundary of the Reykjanes Ridge, northeast Atlantic Ocean, was aimed to assess the influence of the Icelandic mantle-plume, and medium and short wavelength-scale bathymetric segmentation of the spreading ridge on the petrogenesis of oceanic crust. One hundred and eighty-nine bottom sampling stations were occupied between 57°N and 63°N, with a 92% successful recovery of basaltic material. In addition, sediment and biological material was collected from most of the sampling stations. Bathymetric soundings and sidescan sonar imagery was made of the entire axial-valley of the ridge, using the SIMRAD EM12 multibeam-sonar tool on board the RRS *Charles Darwin*, completing the bathymetric and imagery database of the Reykjanes Ridge held by the Institute of Oceanographic Sciences Deacon Laboratory.

KEYWORDS

BASALT
BIOLOGICAL SAMPLING
"*CHARLES DARWIN*"/RRS - cruise(1993)(CD80)
HYDROTHERMAL ACTIVITY
ICELAND HOT SPOT
MULTIBEAM SONAR SOUNDING
NORTHEAST ATLANTIC
OCEAN CRUST
PETROGENESIS
REYKJANES RIDGE
SEDIMENTS
SONAR IMAGERY
SPREADING CENTRES
SWATH BATHYMETRY

ISSUING ORGANISATION

Institute of Oceanographic Sciences
Deacon Laboratory
Wormley, Godalming
Surrey GU8 5UB. UK.

Director: Colin Summerhayes DSc

Telephone Wormley (0428) 684141
Telex 858833 OCEANS G.
Facsimile (0428) 683066

Copies of this report are available from: ***The Library,*** *PRICE £17.00*

CONTENTS

SCIENTIFIC PERSONNEL

MURTON, Bramley (Principal Scientist)	IOSDL
PARSON, Lindsay	IOSDL
EVANS, Jez	IOSDL
OWENS, Robin	Oxford University
SATUR, Nick	IOSDL
REDBOURN, Lisa	Plymouth University
SAUTER, Daniel	Louis Pasteur Université, Strasbourg
TAYLOR, Rex	Royal Holloway & Bedford New College
WALKER, Cherry	Leeds University
FORSTER, Joanne	Geotek
ANDERSON, Howie	RVS
FERN, Adrian	RVS
JONES, Jeff	RVS
PAULSON, Chris	RVS
PHIPPS, Richard	RVS
WYNAR, John	RVS

SHIPS PERSONNEL

BOURNE, R.A.	Master
LEATHER, C.M.	Chief Officer
ATKINSON, R.M.	Second Officer
THOMPSON, M.W.	Third Officer
WOODS, D.R.	Radio Officer
BENNETT, I.R.	Chief Engineer
LOVELL, V.E.	Second Engineer
GREENHORN, A.	Third Engineer
BELL, S.J.	Third Engineer
DRAYTON, M.J.	Chief Petty Officer (Deck)
VRETTOS, C.	Petty Officer (Deck)
COOK, S.C.	SG1A
BUFFERY, D.G.	SG1A
JACKSON, R.J.	SG1A
JONES, S.J.	SG1A
NEIL, P.J.	S.C.M.
SWENSON, J.J.	CHEF
LINK, W.J.	Steward
ROBINSON, P.W.	Steward
SMITH, L.V.	Steward
HEALY, A.	MMA

INTRODUCTION

Cruise CD80 on the RRS *Charles Darwin* conducted a sampling programme, PETROS (petrogenesis of oblique spreading) along the Reykjanes Ridge between 57°N and 63°N (figure 1) during the 1st September 1993 (from Barry, south Wales) to the 1st of October 1993 (arriving in Reykjavik, Iceland). In addition to the rock sampling programme, a new SIMRAD EM12 multibeam swath bathymetry system was employed to complete our bathymetric and sidescan coverage from 57°N to 63°N along the axial crest of the Reykjanes Ridge (figure 2). One hundred and ninety one sample stations were occupied, of which 31 were rock chipper stations, 158 were conventional dredge stations and 2 were CTD stations (figure 3). This number of sampling stations exceeds by more than 3 times the number originally planned. This was because of the deployment of a rock chipper device with a 45 minute turn around time, and a new dredging strategy in which the dredge is allowed less than a 20 minute bottom time.

Rock sampling targets were en echelon axial volcanic ridges (AVR) and inter-AVR basins, well developed seamounts, 50-120km long swells and inter-swell troughs, the transition zone between axial crest and axial valley morphology centred on 59°N, and the long wavelength regional bathymetric and gravity anomaly associated with the Icelandic hot-spot. These features were identified from high resolution side-scan images (collected with the IOSDL Towed Ocean Bottom Instrument, TOBI), 3.5 kHz echo sounder profiles, free air gravity measurements, and Hydrosweep multibeam bathymetric charts, made during the IOSDL mid-ocean ridge project cruise EW9008 in October 1990, and SIMRAD multibeam bathymetric data and SIMRAD multibeam sidescan sonar data collected during this cruise. In addition, CTD casts were made at stations that, from the sampling or sonar data, gave indications of hydrothermal activity.

More than 400 different rock types were recovered, along with 130 sediment samples, and about 240 biological samples. The average space between sample station was 2 km, although in detailed sampling areas the spacing was 1 km. This is the highest density of rock samples taken anywhere along the MAR, and increases by ten times the number of samples collected along the Reykjanes Ridge during the famous study by Jean-Guy Schilling [1].

The primary objectives of PETROS were to determine the geochemical and tectonic evolution of oblique-spreading ridge segments, to explore and map the relationship between such ridge segments and hydrothermal activity, and to determine the extent of influence of the Icelandic hot-spot on the Reykjanes Ridge.

SPECIFIC OBJECTIVES

To determine the geochemistry of AVRs of different morphology, between 57°30'N and 62°30'N, and thereby assess the relationship between petrogenesis and the volcanic and tectonic evolution of crust forming the axial valley and crest.

To measure the geochemical variation among intermediate-wavelength ridge-segments, between 63°N and 57°N, and hence to explore the behaviour of shallow mantle flow beneath constructive plate-margins.

To detect the geochemical influence of the Icelandic hot-spot mantle plume with distance along the Reykjanes Ridge, between 63°N and 57°N, and to asses its influence on the style of oceanic spreading.

To observe the occurrence and compositional variation of hydrothermal deposits along the axial valley, between 62°30'N and 57°30'N, and hence to assess the relationship of hydrothermal activity with the petrogenetic and tectonic evolution of constructive plate-margins.

We aimed, through the PETROS project, to further our understanding of the relationship between shallow magmatic processes, shallow and deep mantle dynamics, and lithospheric tectonics at constructive plate-boundaries.

SCIENTIFIC BACKGROUND AND RATIONALE

Oblique Spreading at Constructive Plate-boundaries

There is a dichotomy between the occurrence of oblique spreading centres and our current understanding of plate tectonic processes. Spreading centres are considered to be passive features, formed in response to the separation of tectonic plates [2]. Hence their orientation, spreading rate, and morphology are intrinsically linked to global plate-tectonics. By consistently maintaining an oblique orientation to the direction of plate separation, however, oblique spreading centres appear not to conform to the model for their passive behaviour. The study of oblique spreading centres, such as the Reykjanes Ridge, is aimed at elucidating the connection between global plate-tectonics, local plate motion, and the role of the lithosphere and asthenosphere in forming a constructive plate boundary.

The Reykjanes Ridge

The Reykjanes Ridge is a slow-spreading ridge oriented at 035°N, oblique to the plate separation trend of 099°N, that has an axial horst in the north, and an axial graben in the south [3]. Following cruise EW9008 in October 1990 of the R/V *Maurice Ewing*, three scales of morphological feature characteristic of the Reykjanes Ridge have been identified [4,5]. We believe that short-wavelength segmentation (10-50 km), forming en echelon axial volcanic ridges, is linked to local stress distribution and magma-plumbing in the lithosphere. Also, intermediate-wavelength bathymetric segmentation (50-120km) and long-wavelength regional bathymetric variation (over 400km) are the results of mantle dynamics, the former being an affect of diapiric mantle flow in response to plate separation, while the latter is related to variations through time of mantle temperature within the Icelandic hot-spot. A description of these three process and their affects is given in the following sections. The PETROS project aims to examine, identify and separate these essentially different processes, thereby furthering our understanding of the contribution to mid-ocean ridge spreading dynamics by both the local and regional tectonic environments.

Short-Wavelength Segmentation

GLORIA, Hydrosweep and TOBI data show that the primary spreading unit of the Reykjanes Ridge is the AVR, oriented oblique to the trend of the Reykjanes Ridge but orthogonal to the plate separation direction of 099°N, and 30-60km in length. Although AVRs were first recognised from GLORIA images [3], high -resolution deep-towed side-scan sonar images from TOBI, and detailed multibeam bathymetry, revealed marked variation in their morphology. We have interpreted this variation as an effect of an evolutionary cycle of tectonic and magmatic change[4,5].

AVRs with a high aspect ratio (ratio of length to breadth) of 8-12, form narrow ridges of fresh unsedimented and untectonized volcanic material that stand proud of an otherwise tectonized and sedimented axial-valley floor. These features, interpreted as the earliest stage of AVR development, are dominated by fissure- and conical-seamounts and are flanked by a hummocky volcanic terrain.

AVRs with an intermediate aspect ratio of 5-8 form periclinal ridges of fresh volcanic material, and are interpreted as the most constructively mature stage of AVR development. They are dominated by large and abundant flat-topped and conical seamounts and are flanked by both hummocky and sheet-like volcanic terrain.

AVRs with low aspect ratios of <5 form morphologically subdued ridges with many fault controlled horsts and grabens of sedimented and tectonized volcanic material. These features, interpreted as the final and essentially destructive stage in AVR evolution, are dominated by tectonized flat-topped seamounts, although there are also some young-looking, conical seamounts.

Intermediate-Wavelength Segmentation

The bathymetric data between 62°30'N to 57°30'N has shown that the Reykjanes Ridge is further subdivided into broad, intermediate-wavelength swells oriented parallel to the ridge trend of 035°N, and 50-120km long. These swells vary in morphology from periclinal concave-sided high-amplitude types, to concave-sided low-amplitude varieties, to saddle-shaped convex-sided low-amplitude features [4].

Long-Wavelength Bathymetric Variation

The bathymetric and free air Bouguer gravity anomaly profiles along the Reykjanes Ridge show a long-wavelength variation (Figure 4), with a steep slope inflection inclined away from the hot-spot, here termed a 'wave', between shallow (<1100m) seafloor in the north and deep (>1800m) seafloor in the south. The front of the 'wave' coincides with a change in a transition from an axial crest to the north and an axial valley to the south. There is also a change in the spreading style of the Reykjanes Ridge at this transition zone, to the north of the 'wave'-front, spreading occurs via a continuous ridge oriented oblique to the spreading direction and containing short-wavelength AVRs, to the south of the 'wave'-front spreading is by intermediate-wavelength AVRs oriented orthogonal to the spreading direction and separated by short (<10km) transform offsets.

Hypothetical Geodynamic Models

We believe that the various scale tectonic feature identified above result from lithospheric, shallow-asthenospheric, and deep-asthenospheric processes, and expected them to have significant and identifiable geochemical affects. A hypothetical model predicting the petrological and geochemical characteristics of the different processes is outlined below. By testing these predictions against detailed petrological and geochemical analyses of samples collected from carefully selected sites along the Reykjanes Ridge, we expect to identify, differentiate and assess the effects of these different fundamental processes on the formation of oceanic lithosphere.

Lithospheric Evolution Model

The AVR evolutionary cycle, identified above, has all the characteristics of a lithospheric process in which a limited supply of melt is focused into some areas at the expense of others. The various AVR morphologies, from narrow non-tectonized features through rounded hummocky periclinal ones and finally tectonized and sedimented AVRs, reflect changes from initial volcanic activity and waxing magma supply, to mature magmatic development during the highest magma flux, and finally to a tectonically destructive phase of waning magma supply, may be reflected geochemically.

The relationship between the development of the AVR and its geochemistry can be compared to the observed development of propagating ridges in which the initial stages of ridge-tip development are accompanied by fissure eruptions of primitive melts [6].

Shallow Asthenospheric Diapiric Flow Model

The intermediate-wavelength segmentation along the Reykjanes Ridge has all the bathymetric features characteristic of shallow (<40km deep) adiabatic asthenospheric upwelling which forms distinct mantle micro-plumes with a separation of 70-150km. Such micro-plumes are less dense than the surrounding mantle and generate 'bulls-eye-shaped' negative gravity anomalies and are generally considered to be responsible for second-order, intermediate-wavelength bathymetric segmentation [7] . Experiments using layer density models suggest the micro-plumes form as result of Rayleigh-Taylor instabilities [8,9].

We believe that melt production and focusing should be greatest in micro-plume centres (where the mantle has the greatest vertical adiabatic component) ensuring that crustal formation is dominant over crustal extension above the micro-plumes. This process is manifest by shoaling of the spreading ridge over the plume centre due to the thermal buoyancy effect of hot mantle, combined with an enhanced magma flux and a consequently thicker volcanic crust [10].

Deep Mantle Flow Model

The long-wavelength regional bathymetric and free air gravity variation along the Reykjanes Ridge is probably related to large-scale variations in mantle temperature and or composition that are initiated by the Icelandic Hot-spot. Ideally the bathymetry around a hot-spot should deepen continuously as the temperature of the plume-head decreases away from its centre [11] . The segment of the Reykjanes Ridge that deviates from this predicted increase in depth (ie. the 'wave') reflects an anomalously low mantle density.

From the coincidence between the position of the 'wave'-front and the transition in morphology of the Reykjanes Ridge, from a ridge crest in the north to an axial valley in the

south, we infer a relationship between variations in mantle temperature (originating here in the hot-spot) and changes in spreading style. Spreading and crustal accretion at the Reykjanes Ridge over the past 10-14 Ma has preserved a history of these deep-mantle processes that would not otherwise be apparent [12]. The linear magnetic reversal pattern about the Reykjanes Ridge reveals a history of changes of spreading style. Between magnetic anomalies 15 and 13, the ridge changed from a spreading style characterised by an oblique crestal ridge and AVR segmentation, to a spreading style dominated by an orthogonal pattern of short ridge segments and offsets [12,13]. This change migrated rapidly from north to south by means of ridge jumping, overlapping, decapitating, and linking indicating a progressive cooling of the mantle beneath the Reykjanes Ridge[12]. The orthogonal pattern of spreading continued until magnetic anomaly 7 time, when a reversal to oblique spreading began again in the north, and migrated south to its present position at 58°N. Should there be a relationship between spreading behaviour and the mantle temperature 'wave', originating in the Icelandic hot-spot, then the magnetic reversal pattern suggests a propagation of the 'wave' from north to south down the ridge at a rate of 10 cm per year [14].

The identification of mantle temperature 'waves' migrating out from Iceland provides a unique opportunity to examine the relationship between the temperature and geochemical components of the hot-spot plume. The variation in hot-spot geochemical signature away from Iceland will give an indication how the head of the hot-spot plume dissipates away from its centre, what the thermodynamic and geochemical processes forming hot-spots are and how hot-spot mantle plumes interact with the shallow asthenosphere.

CRUISE STRATEGY

Rock Sampling

The positions of the sample stations are shown on figure 3. Four areas were targeted in detail: the "C" area (57°N to 58°N), the "transition zone" (58°30'N to 59°30'N) where the ridge changes from an axial crest to an axial valley, the "B" area (60°N to 61°30'N) and the "A" area (61°30'N to 62°30'N). The nomenclature of areas "A" to "C" is the same as that adopted for the same three areas surveyed during cruise EW9008 in 1990. Within each of the four main areas studied during cruise CD80, three AVRs were targeted in detail, each AVR representing the initial-, middle- and end-members of volcanological morphology and development. Detailed sampling involved a minimum of one station at each AVR tip and two stations located near its centre. In addition a total of thirteen swells, and their inter-swell basins, were targeted in detail. Further, every non-special AVR was targeted with at least two stations, and every inter-AVR basin with one station. Care was taken not to preferentially sample seamounts or non-seamount areas. Precise stations were selected on the basis of TOBI

sidescan sonar imagery, multi-beam bathymetry, 3.5 kHz echo sounder profiles and acoustic back-scatter energy (from the SIMRAD multi-beam sonar). Areas with high probability of bare rock exposure were preferred to those with probable sediment drape.

The final distance between sample stations was, on average, 2 km. As the sampling progressed the strategy developed according to experience, by ground truthing the various geophysical data-sets, and by time constraints imposed by both the performance of the sampling devices (see following sections) and time lost due to poor weather (a total of 70 hours).

The northern latitude of the Reykjanes Ridge has a history of glacial sediment input, so care was taken to avoid collecting material that was rounded and hence possibly not *insitu*. As well as the historic glacial sediment input, the influence from the Irminger Current and Norwegian Sea Current sweeping the ridge with sediment has led to local sediment ponds that hindered sampling. The rock chipper suffered the greatest from sediment drape, and was eventually abandoned as a sampling device for this reason (see following sections).

Geophysics Surveying

The SIMRAD EM12 multi-beam swath bathymetry system was used for the first time on the RRS *Charles Darwin* cruise CD80 (see following sections). We occupied five survey areas (figure 2), the main area being between 58°30'N and 59°30' around the "Transition Zone". In addition we logged the EM12 data during all station work and hence have covered the entire axial region of the Reykjanes Ridge with both EM12 multibeam bathymetry and sidescan. Sidescan sonar imagery from the EM12 is comparable in resolution to instruments such as the 30kHz sidescan sonar SEAMARK II. We found the EM12 to be an essential tool when fine tuning the position of sample stations in poorly charted areas. Our strategy was to steam through the station way point while scrutinising the bathymetry and backscatter data, then relocate the sample station accordingly. The ship's crew were then informed of the new position for the station and the vessel subsequently repositioned.

During surveying, we also deployed and logged total magnetic field intensity from the towed flux gate magnetometer; gravity from the on board LaCoste and Romberg gravity meter; 3.5 kHz (depth and echo strength) and 11 kHz echosounder data (both from dolphin-fish borne transducer arrays). During station work, the magnetometer was recovered and hence not logged.

Water Column Studies

Two CTD, nephelometer and transmissometer stations were occupied. The first was made on the basis of some unusual biology recovered and heavily Mn-stained basalts and involved a down cast, tow-yow and up-cast. A nephel -rich plume signal was identified 250-300 m above the seafloor that was narrow (5-10 m deep) but consistent over a lateral distance of 500 m. The second deployment was made on the basis of diffuse echoes extending for 30 m above the seafloor observed on both the 3.5 kHz and 11 kHz echo sounders. No optical signals were seen during the casts, but temperature conductivity layers of 50m thick were observed. Although the acoustic features remain unidentified, we note that a seismic swarm began in the vicinity (best location of 61°42'N), detected two days later.

POST CRUISE RESEARCH PLAN

Because the Icelandic Hot-spot is geochemically close to N-MORB (except for its elevated 3/4He ratio) it will be essential to ensure the highest degree of analytical sensitivity when analysing the samples in order to discriminate the various effects of mantle heterogeneity and variable partial melting that we anticipate finding along the Reykjanes Ridge.

The major data set collected on CD80 are the rocks. Hard rock analyses are to be made by Dr Rex Taylor (Southampton University/Royal Holloway and Bedford New College, Egham), working in collaboration with Bramley J Murton (IOSDL) and Mathew Thirlwall RHBNC (RHBNC). We expect to analyse 300 bulk-rock samples for major and trace elements by a combination of XRF and inductively-coupled plasma mass spectrometry (ICP-MS). Rare-earth-element analyses will be made by a combination of ICPMS and isotope dilution, spark source mass spectrometry. Isotope analyses for 87/86 Sr, 143/144 Nd, 204/206/208 Pb, 3/4He and possibly U/Th disequilibrium will also be made. Petrological studies are to include micro-probe analyses and digitally determined mineral abundance analysis.

The geophysics data set are to be used initially with the ground truthing to develop a relative age map, and hence volcanic activity map, for the ridge. We aim then to further our understanding of the tectonic and volcanic processes that operate along the ridge axis. Our initial impression is that the new data support our initial model of AVRs in different stages of volcanic construction and tectonic destruction [4,5].

In addition to the rock samples collected were about 240 biological samples and 130 sediment samples. The biological and sediment samples were frozen at minus

8°C. The biological samples represent one of the most complete suites of data for the regional variation in the colonisation of mid-ocean ridges and are to be the subject of an MSc student thesis

BJM

REFERENCES

[1] Schilling J-G., Zalac M., Evans R., Johnston T., White W., Devine J. D., and Kingsley R. Petrological and geochemical variations along the Mid-Atlantic Ridge from 29°N to 73°N.
American Journal of Science, 283, 510-586.

[2] Mackenzie D.P., 1985 The extraction of magma from crust and mantle.
Earth Planetary Science Letters, 74, 81-91.

[3] Laughton A.S., Searle R.C. and Roberts D.G.,1979, The Reykjanes Ridge crest and the transition between its rifted and non-rifted regions.
Tectonophysics, 55, 173-177.

[4] Murton B.J. and Parson L.M., 1993 Segmentation, volcanism and deformation of oblique spreading centres: a quantitative study of the Reykjanes Ridge.
Tectonophysics, 222, 237-257.

[5] Parson, L.M., Murton, B.J., and Searle, R.C., et al., 1993 En echelon volcanic ridges at the Reykjanes Ridge: a life cycle of volcanism and tectonics.
Earth Planetary Science Letters, 117, 73-87.

[6] Christie D.M. and Sinton J.M., 1981 Evolution of abyssal lavas along a propagating segment of the Galapagos spreading centre. Earth Planet.
Earth Planetary Science Letters, 56, 321-335.

[7] Lin J., Purdey G.M., Schouten H, Sempere J.-C. and Zervas,1990 C. Evidence from gravity data for focused magmatic accretion along the Mid-Atlantic Ridge.
Nature, 344, 627-632.

[8] Macdonald K.C., Fox P.J., Parram L.J., Eisen M.F., Hasman R.M., Miller S.P., Corbotte S.M., Cormier M.-H., and Shor A.N., 1988 A new view of the mid ocean ridge from the behaviour of ridge-axis discontinuities.
Nature, 355, 217-222.

[9] Whitehead J.A., Dick H.J.B., and Schouten H., 1988 A mechanism for magmatic accretion under spreading centres.
Nature, 312, 146-148.

[10] Crane K., 1985 The spacing of rift axis highs; dependence upon diapiric processes in the underlying asthenosphere.
Earth Planetary Science Letters, 72, 405-414.

[11] White R.S., 1989 Asthenospheric control on magmatism in ocean basins. In: Magmatism in the ocean basins (eds. Saunders A.D. & Norry M.J.).
Geological Society Special Publication No. 42, 22-32.

[12] Vogt P.R., 1974 Asthenospheric motion recorded by the ocean floor south of Iceland.
Earth Planetary Science Letters, 13, 153-164.

[13] Vogt P.R., 1974 The Icelandic Phenomenon: Imprints of hot-spot on the ocean crust, implications for flow beneath plates.
pp 105-126 in, Geodynamics of Iceland and the north Atlantic Area. (ed. Kristjonsson L.). Dordrecht: D. Reidel.

[14] Vogt P.R. and Avery O.E., 1974 Detailed magnetic surveys in the northeast Atlantic and Labrador Sea.
Journal of Geophysical Research, 79, 363-342.

INSTRUMENTATION REPORT

Sampling Objectives: Petrology and Volcanology

One of the primary objectives of CD80 was to investigate the petrological and geochemical variation along the Reykjanes Ridge. To realise this objective, sampling was organised to maximise spatial coverage along the targeted region of the ridge. Further objectives (discussed in detail in section 1) were to investigate the nature and petrology of individual AVR's and swells. This was approached by selecting particular AVR's and swells along the ridge for closer-spaced sample targets (figure 4).

Sampling Methodology and Procedure

Two rock sampling techniques were employed during CD80; the rock-chipper and the dredge.

The Rock-Chipper

The rock-chipper consists of five case hardened steel cutting cups capped with analytical grade wax. A hole was made in the wax cap to allow any sediment to be captured and recovered inside the cup. The cups were bolted to a steel head assembly, which in turn was bolted to a lead and steel column (figure 5). The chipper was deployed using the hydro wire until the tool was approximately 200m from the SIMRAD Precision Echo Sounder determined sea floor depth. At this stage the rock-chipper was halted for 5 mins to allow it to stabilise. The rock-chipper was then lowered at a rate of 125 m/min until impact. This was observed as a change in wire tension on strain gauge and load meter.

When the rock-chipper arrived on deck, the chipper-head was unbolted and carried to the processing area with the cutting edges facing down to avoid sediment loss from the cups. The rock-chipper cutters were then removed from the head and checked for sediment content. If present, the sediment was removed and bagged. The larger rock fragments were hand picked from the wax. To remove the embedded fragments from the wax, the cutting cups were placed into beakers of water at 150°C. After 45 minutes the wax floated to the surface and deposited the fragments at the base of the beaker. The hot wax was then decanted from the beaker and the rock sample recovered. The sample was then described and bottled.

The Dredge

The dredge consisted of a standard assemblage of jaws, chain-bag and pipe-dredge. Samples were obtained from both the chain bag and the pipe-dredge. The dredge was

deployed off the afterdeck on the coring wire with three and five tonne weak-links on the shackle and chain respectively. A 10.2 kHz pinger was attached to the cable at 200m above the dredge. The dredge was lowered until it reached the bottom. At this point the wire-out and ship position were logged. The ship then made way for approximately 1 cable or 5 minutes. Hauling-in then proceeded at <10 m/min, until the dredge was lifted off the bottom. Total bottom -time for the dredge never exceeded 20 minutes. Wire-out and ship position were logged at this time. The dredge was then recovered to the after deck.

Material sampled by the pipe-dredge consisted of combinations of unconsolidated sediment, rock fragments and fauna, while the bag dominantly recovered solid rock samples. After recovery, the haul was initially separated into biological and geological groups. Representative biological specimens were selected and immediately frozen or placed in preservative. Any unconsolidated sedimentary material from the pipe-dredge dredge was bagged and frozen. Solid rock material was washed, prior to sorting into distinct morphological and petrological groups.

The dredge's track across the sea floor during its bottom-time was then calculated, assuming the dredge took a straight path behind the ship and that the dredge wire was taught, using trigonometric theorem.

Sampling strategy and its evolution

Of the two sampling techniques, the rock-chipper has the advantage recovering material from a relatively exact location beneath the ships station, and collecting from an individual outcrop. In addition, the round-trip time is effectively limited to the descent and ascent of the tool through the water column. Disadvantages of the rock-chipper technique that were experienced include the sample size (typically < 5g) and the relatively high rate of failure to collect any rock sample. The fact that rock material was not recovered at many deployments (around 50%) was ascribed to the chipper-head colliding with sediment or coral. A further disadvantage of the rock-chipper is that it requires the vessel to remain exactly on station while the tool is deployed. This means that when rough sea conditions are experienced, positional stability cannot be guaranteed and therefore the rock-chipper cannot be used.

The dredge has advantages over the rock-chipper in having a relatively high success rate (around 95%) and the recovery of large sample masses (approx.1 to 100kg). However, a significant disadvantage of the dredge is the relatively imprecise location of the recovered material. This is due to the distance the dredge covers while on the sea floor. As the requirement of a perfectly stable station is not essential during dredging, the dredge can be

deployed in more adverse weather conditions compared to the rock-chipper. However, it should be noted that modification to the traditional method of dredge deployments on CD80 resulted in dredging being continued into worse weather than had been possible before. The modifications essentially involved the setting of cleats in the afterdeck (about three metres fore'ward of the position occupied by the dredge when it was hanging from it wire above the deck with the A-frame fully retracted). Ropes were fastened to the dredge bag by hooks, while the dredge was level with the afterdeck railing but still over the side, and then run through the deck-cleats, taking up the slack both fore'ward and beamward, thus stabilising the dredge during recovery.

In the initial stages of the cruise the rock-chipper was deployed at 60% of the planned way points. However, the failure to recover rock samples at many sites during this period led to a re-evaluation of rock-chipper sites. Rock-chipper deployment was then restricted to sites which were assessed as having minimal sediment cover on the basis of TOBI sidescan images. Where TOBI data was not available, the decision to deploy the rock-chipper was based on observations from the ship's 3.5 kHz echo sound profiler. After 75 way points the dredge turn-around time had decreased to around 2.5 hours, not significantly more than that of the rock-chipper. This, in combination with the continued low success rate of the rock-chipper, led to the decision to change the sampling strategy to dredging only.

During the first two deployments of the dredge, the bottom time was 20 mins. This was subsequently shortened to 15 mins to reduce the turn-around time for each dredge deployment. The dredge on bottom time was further reduced to five minutes after way point 71. An additional advantage of a shorter bottom time is a more precise sample track. The length of the sample track was calculated as 800 m for 30 minutes bottom -time and 356m for 5 minutes bottom-time.

Sample Cataloguing and Storage

The igneous samples were catalogued with reference to:

phenocryst composition and content
vesicle density
morphology (sheet flow, pillow lava, or not determinable)
freshness
manganese staining

The larger fragments (>10cm) were stored in heavy duty woven sacks. The smaller fragments were placed in plastic containers or bags and boxed prior to transport.

The chipper samples were stored in 60ml plastic bottles. Because of the change in sampling strategy resulting in an order of magnitude more samples being collected, and the unexpected recovery of sediment and biological samples, we ran out of purpose storage material (bags and bottles) by half-way through the cruise. This problem was overcome through the use of plastic rubbish-bags donated by the Chief Steward's office.

Thin-sections were made on board for the major lithology recovered at ~60 of the sample stations. These were prepared in the traditional way: a 5mm slice was removed from the interior of the sample by a diamond trim-saw, this slice was then polished on one side on successively finer carborundum grits (from 120 to 400 grade), it was then fixed to a glass-slide using canada balsam and a hot-plate, when set the other side of the rock-slice was then polished through successively finer carborundum grits until a constant thickness of 30mm was attained, the finished thin-section was then coated in fine-grade mineral oil to aide microscopy.

Volcanological and Petrological Observations

Of the volcanic material collected ~20% could not be positively assigned to either pillow lava or sheet flow. The remaining rocks were in the ratio of 75:25, pillow to sheet flow. Around 95% of the lava recovered was categorised as unaltered to slightly altered. Most of the samples had fresh glassy margins, and relatively crystalline inner sections. Some alteration of the glass was observed in certain hauls. This correlated with the presence of a sedimentary layer above the lava.

Some idea of the relative age of the flows was gained from the state of alteration, presence and thickness of sedimentary cover and degree of colonisation by fauna. Manganese staining was noted on several samples but no correlation between its presence and sample age and location could be established.

On most occasions (70-80%) the dredge haul recovered a single petrological type (based on phenocryst, lava form and alteration characteristics). This petrological grouping was separated into sub-groups on, for example, the basis of glassy pillow rim and pillow interior sample. The most common difference between lavas within a single haul was variation in phenocryst content. Over the course of the sampling only three phenocryst phases were observed. In decreasing order of abundance these phases are plagioclase, olivine and clinopyroxene. Each dredge sample was categorised by the observer into aphyric, sparsely phyric or highly phyric. From this data it was possible to plot the distribution of

phenocrysts and their abundance with sample location. From this it was seen that clinopyroxene is restricted to the interval between 59°N and 61.5°N.

THE SIMRAD EM-12 SYSTEM

The first use of the Darwin's EM-12 multibeam sonar mapping tool was during the CD80 (PETROS) cruise to the Reykjanes Ridge in September to October 1993. The swath bathymetry data covered five designated survey areas (fig. 2) as well as all 196 sample stations and inter-station areas. The quality of the data was of an extremely high standard, both from the designed survey lines and from the stations. The swath extended over approximately four times the water depth, with a minimal of signal drop-outs at far the range of the swath (even in sea-state force 8), and no detectable interference from other acoustic equipment in use. The sidescan sonar output from the EM12 was also of excellent quality, with a sample resolution seemingly closer to that achieved for generic sidescan sonar systems such as SEAMARK II. Hard-copy output from the EM12 sidescan sonar was arranged at a scale of 1:50,000 to match the existing hard-copy TOBI records for the Reykjanes Ridge. The hard-copy output produced real-time slant-range corrected and anamorphosed imagery.

Unlike conventional sidescan sonar data, those from the EM12 were automatically corrected for variations in signal intensity and scattering with a derivation of Lambert's Law (using the recorded bathymetry as an incidence reference). As a result, the output was a close approximation of the acoustic back scattering strength due to roughness and physical properties of the seafloor.

Multibeam Sonar Acquisition

The MERMAID system, SIMRAD's generic data acquisition package, was based on a SUN Spark 10 platform. Its primary function was to logg raw-data, and correct this for changes in the attitude of the vessel (roll, pitch and heave) as the data were acquired.

Multibeam Sonar Processing

The NEPTUNE system, SIMRAD's generic data processing package, was also mounted on a SUN Spark 10 platform. Its primary function was to clean the data for both systematic and non-systematic errors, merge the data with corrected navigation, and generate files suitable for plotting with a variety of geographic projections. Data quality control filtering by NEPTUNE involved noise and spike filtering using a wide range of parameters and

statistically based thresholds. It also provided gridding routines to assemble coherent data sets from a number of survey lines.

Multibeam Sonar Visualisation

The third component of data reduction with SIMRAD's generic software is through the IRAP module, a visualisation software package allowing a high degree of flexibility in data viewing and analysis. The software was mounted on the same SUN Spark10 as the NEPTUNE system. Data representations were produced as both pan-form charts and 3D trend-surface diagrams. Hard copy outputs were available for sizes up to A3 (for colour fill and/or isobath charts) or up to A0 for isobath charts only.

Sidescan Sonar Data

The sidescan sonar data from the EM12 system is available in two formats: a geometrically corrected and Lambert's Law corrected out put; and as a total reflectivity map for each beam. The latter proved to be easy to import on to a workstation and to be visualised, being correct for navigation and beam position. However, the quality of the data was poor, with systematic artefacts due to the geometry of the data acquisition system swamping any useful geological information. The more conventional sidescan data from the EM12 was not possible to load on to a work station because of difficulties in understanding the SIMRAD formats. The data hard copy out put was excellent, however, although the Lambert's law correction for beam -slope incidence was of questionable advantage for geological interpretation.

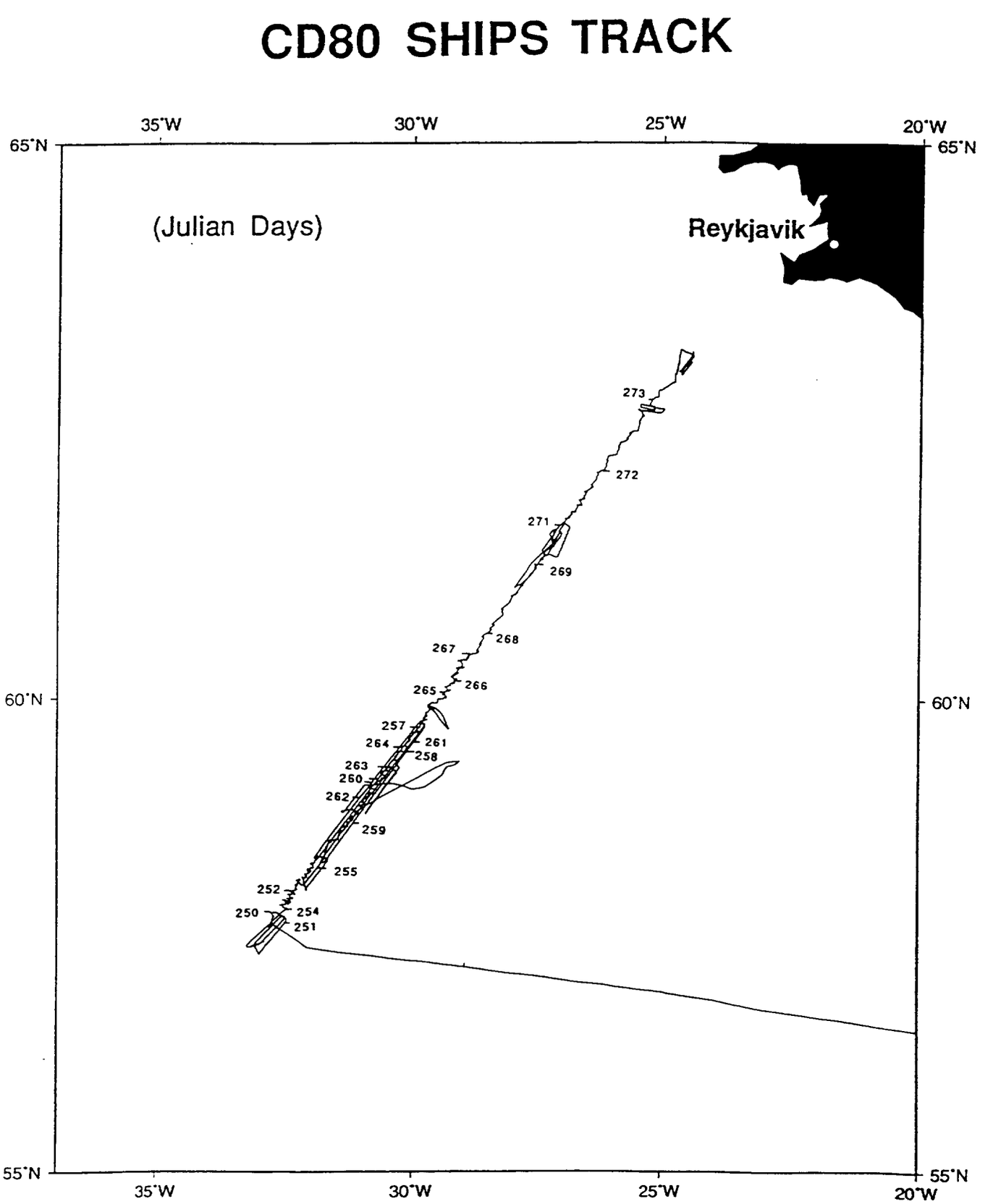


Fig. 1 Track chart: RRS *Charles Darwin* Cruise CD80, 01 Sep - 01 Oct 1993

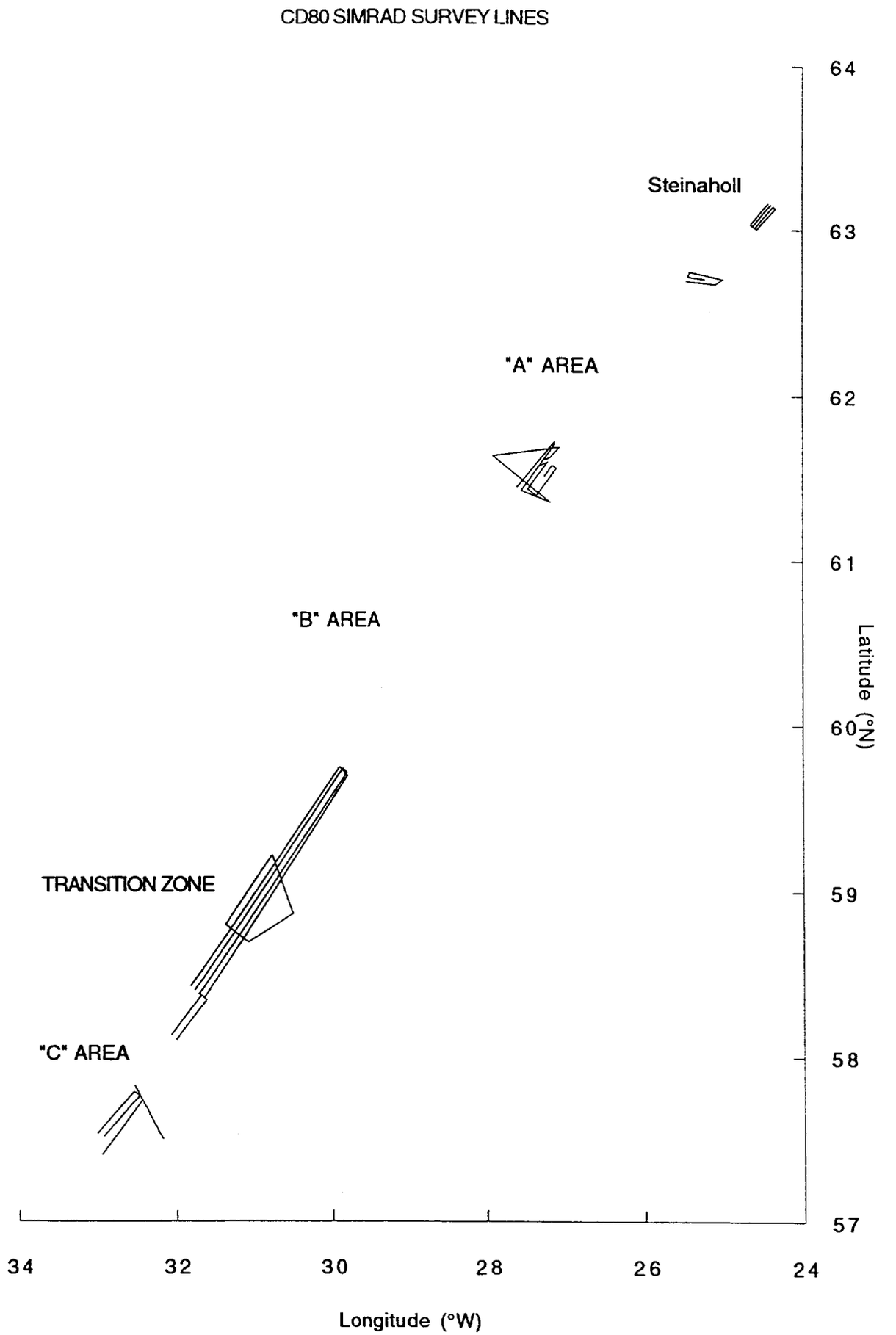


Fig. 2 SIMRAD EM12 multibeam swath sonar surveys (excluding station transit lines during bottom sampling)

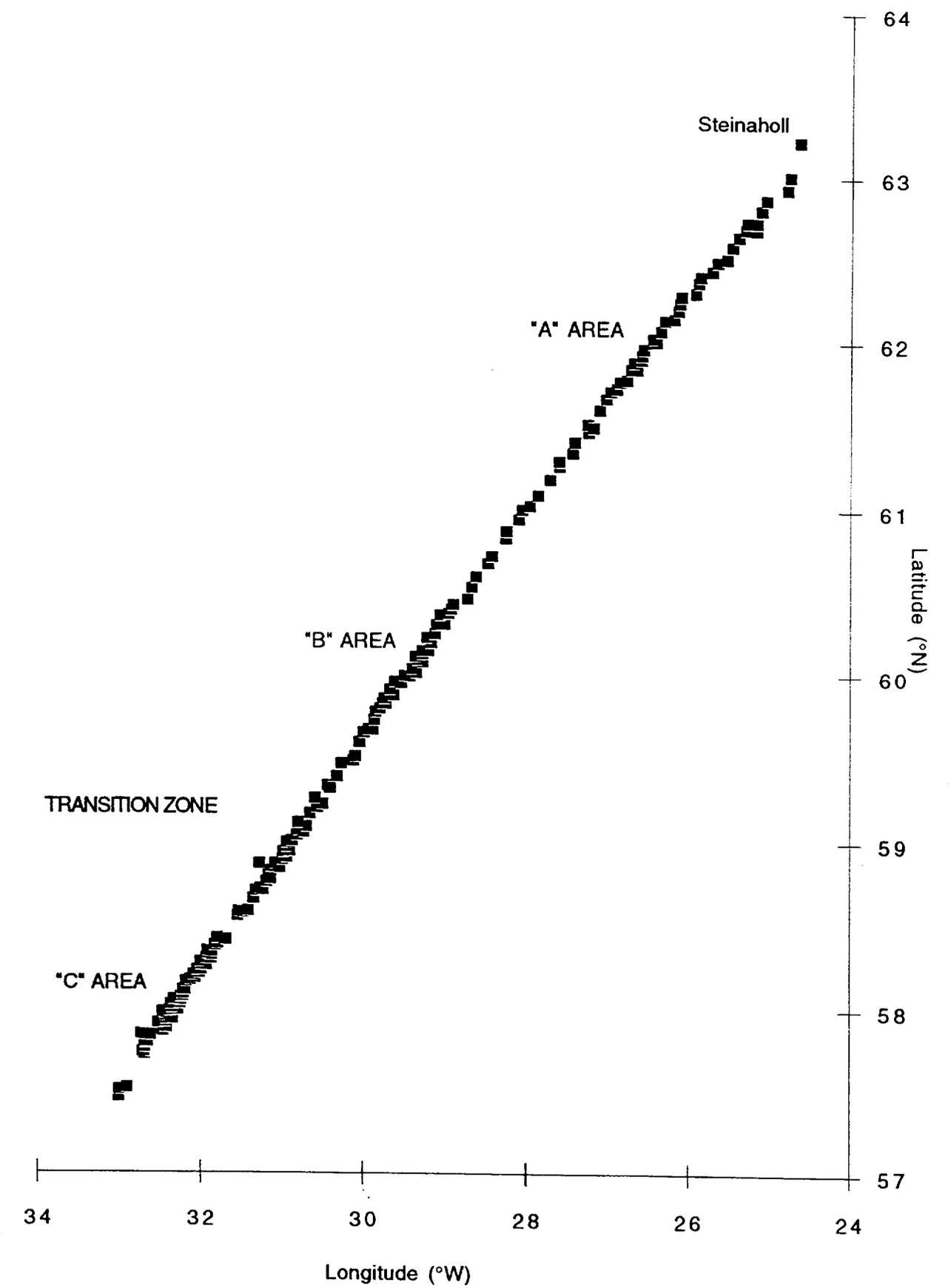


Fig. 3 Bottom sampling stations for CD80

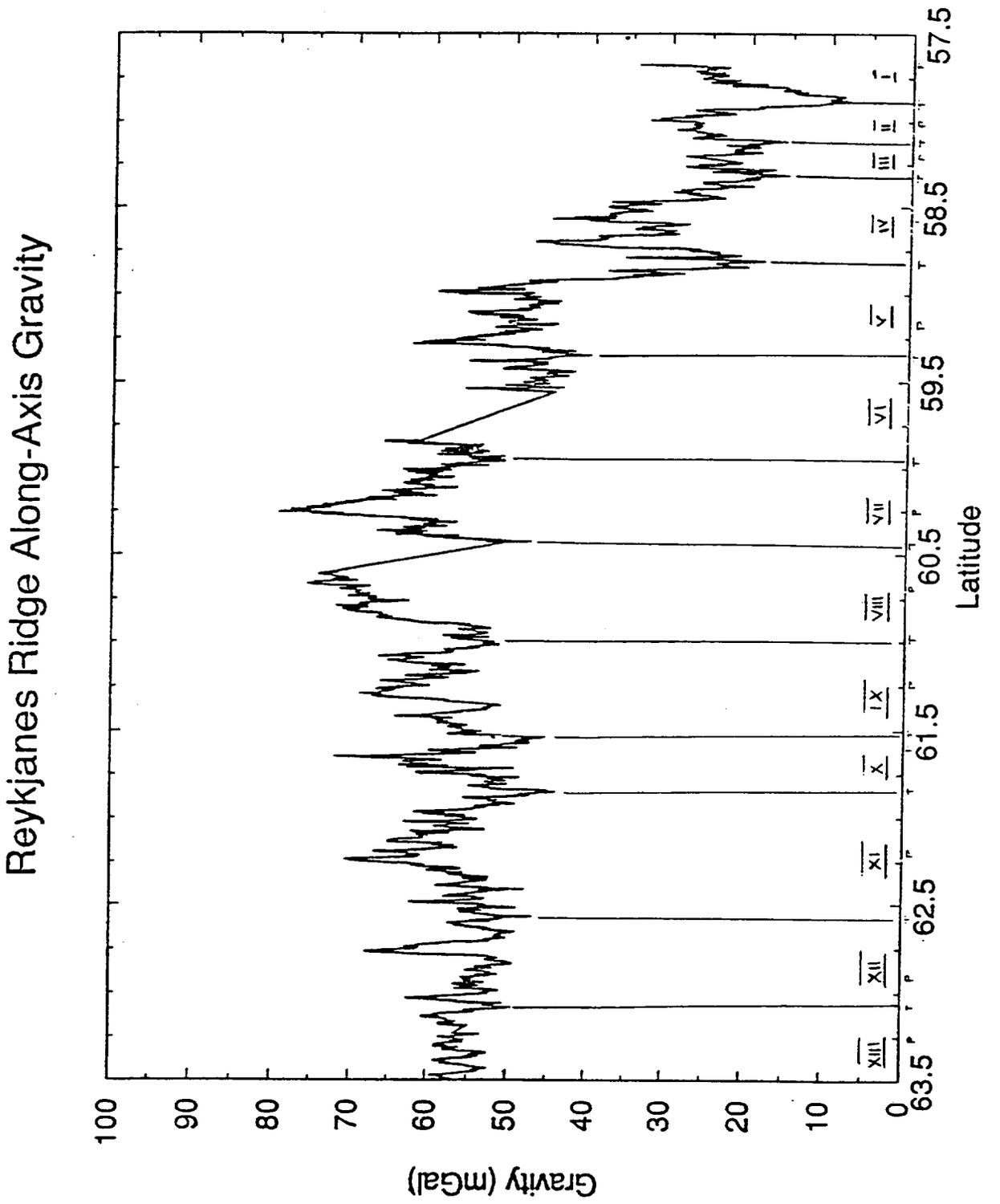


Fig. 4 Free-air gravity profile along the Reykjanes Ridge showing the position of the swells and intervening troughs referred to in Appendix 2.

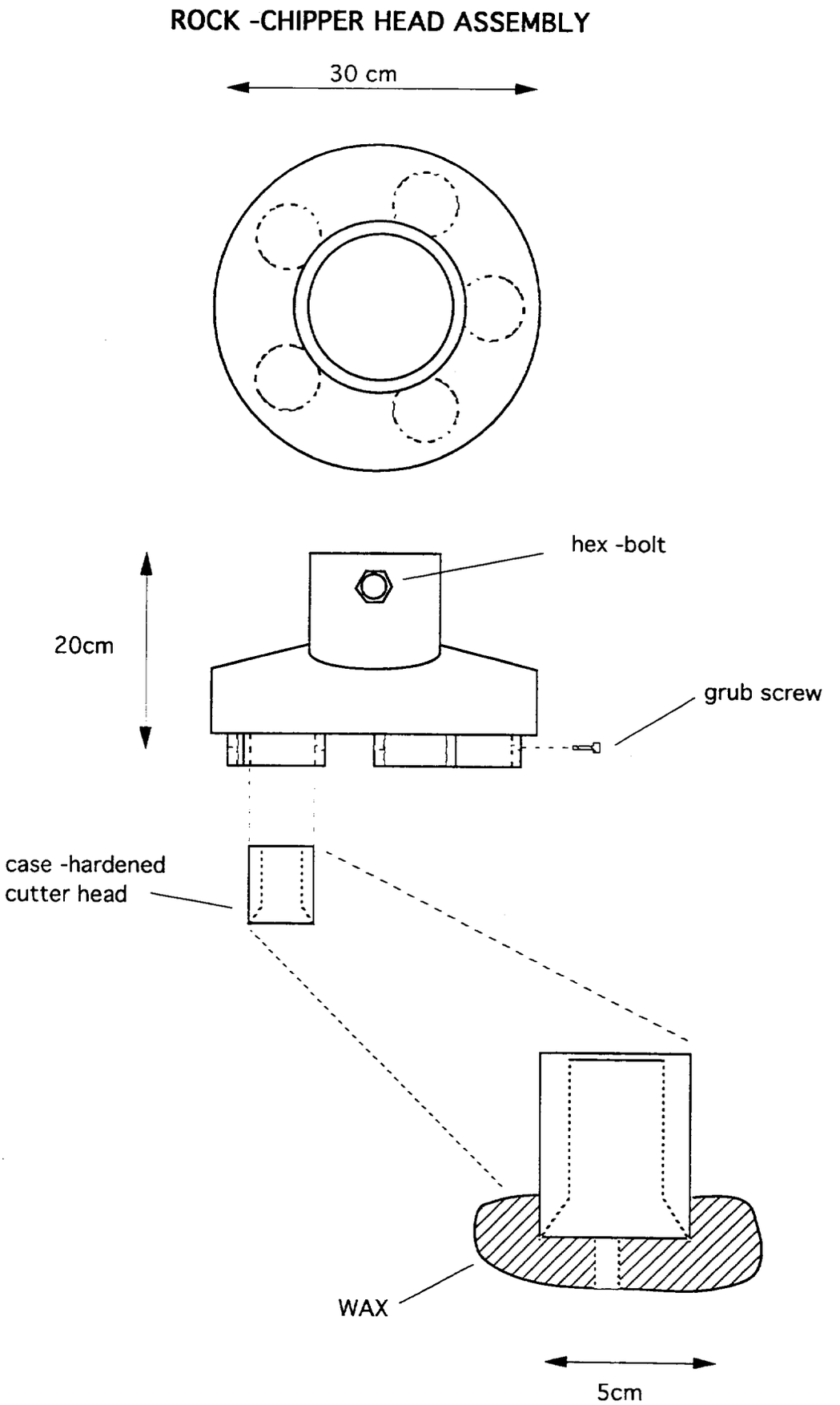


Fig. 5 Chipper head assembly

DAY/TIME	LAT. (°N)	LON. (°W)	W.P.	COURSE	HEADING	SPEED	DEPTH	MAGNETICS	GRAVITY	3.5kHz	10.2kHz	SPECIAL COMMENTS
Julian day				°N	°N	kts.	(m)	nT	mGal	ECHO STRENGTH	ECHO STRENGTH	
248/0000Z	56° 34.30	19°49.00		278.7	276.0°	11.8	1359	49891	12930.2			Start Logging CD80
248/0030Z	56°35.30	19°59.90		278.7	273.3°	11.8	1387	50190	12936.5			
248/0100Z	56°35.70	20°10.80		278.7	272.4°	11.8	1406	50209	12955.7			
248/0130Z	56°36.60	20°21.80		278.7	272.8°	11.8	1513	50143	12970.3			
248/0200Z	56°37.20	20°32.30		278.7	277.3°	11.8	1397	50267	12976.8			
248/0230Z	56°38.10	20°43.30		278.7	277.6°	11.8	1531	50187	12946.6			
248/0300Z	56°38.80	20°53.80		278.7	276.7°	11.8	1728	50293	12955.9			
248/0330Z	56°39.60	21°04.30		278.7	277.1°	11.8	1701	50229	12979.6			
248/0400Z	56°40.50	21°15.60		278.7	275.3°	11.8	1756	50336	12987.5			Change Watch
248/0430Z	56°41.80	21°25.70		278.7	277.1°	11.8	1925	50085	12987.6			
248/0500Z	56°42.50	21°36.40		278.7	272.9°	11.8	2016	50265	12981.5			
248/0530Z	56°43.20	21°47.30		278.7	275.1°	11.8	2186	50160	12976.4			
248/0600Z	56°43.90	21°57.80		278.7	275.3°	11.8	2170	50173	12979.0			
248/0630Z	56°44.80	22°07.90		278.7	275.4°	11.8	2261	50533	12972.1			
248/0700Z	56°45.10	22°18.75		278.7	276.4°	11.8	2280	50472	12975.2			
248/0730Z	56°46.70	22°29.50		278.7	275.9°	11.8	2461	50656	12972.6			
248/0800Z	56°47.60	22°38.50		278.7	277.1°	11.8	2676	50716	12983.7			Change Watch
248/0830Z	56°48.60	22°49.60		278.7	278.9°	11.8	2801	50938	12966.9			No PES Depth recorded
248/0900Z	56°49.30	23°00.00		278.7	276.6°	11.8	3078	50788	12959.9			
248/0930Z	56°50.10	23°10.40		278.7	277.9°	11.8	3130	50722	12958.1			
248/1000Z	56°50.90	23°20.90		278.7	278.6°	11.8	3111	50562	12959.9			
248/1030Z	56°51.70	23°31.59		278.7	275.3°	11.8	3063	50478	12964.5			
248/1100Z	56°52.00	23°42.10		278.7	277.1°	11.8	3034	50900	12969.4			
248/1130Z	56°53.70	23°52.90		278.7	274.0°	11.8	3015	50641	12971.3			
248/1200Z	56°55.10	24°03.10		278.7	275.3°	11.8	2958	50334	12975.1			Change Watch
248/1230Z	56°55.95	24°14.00		278.7	274.3°	11.8	2944	50762	12977.1			
248/1300Z	56°56.49	24°24.69		278.7	272.8°	11.8	2942	50936	12978.5			
248/1330Z	56°56.85	24°35.36		278.7	274.1°	11.8	2921	50428	12980.0			
248/1400Z	56°58.27	24°45.80		278.7	272.9°	11.8	2900	50876	12982.6			
248/1430Z	56°59.6	24°56.59		278.7	271.6°	11.8	2889	51018	12983.9			
248/1500Z	56°59.95	25°07.40		278.7	271.6°	11.8	2867	50650	12982.0			
248/1530Z	57°00.12	25°17.95		278.7	270.1°	11.8	2851	50700	12981.8			
248/1600Z	57°00.28	25°28.79		278.7	269.8°	11.8	2834	50959	12980.6			Change Watch
248/1630Z	57°02.2	25°40.90		278.7	272.1°	11.8	2835	51177	12980.8			
248/1700Z	57°03.0	25°49.80		278.8	273.9°	11.7	2788	50820	12981.7			
248/1730Z	57°04.1	26°01.50		278.8	278.3°	11.7	2730	50792	12984.4			
248/1800Z	57°04.6	26°12.40		278.9	272.8°	11.7	2658	50982	12990.9			
248/1830Z	57°05.6	26°23.8		279.1	271.6°	11.7	2772	51293	12989.3			Lat/Lon now read from Level B
248/1900Z	57°06.1	26°32.7		279	271.3°	11.7	2762	51253	12990.8			
248/1930Z	57°06.3	26°43.8		279.2	271.3°	11.7	2790	51011	12996.8			
248/2000Z	57°07.31	26°54.09		279.3	275.1°	11.7	2809	51372	12989.9			Change Watch
248/2030Z	57°08.37	27°04.67		279.1	276.3°	11.2	2805	51127	12994.5			
248/2100Z	57°09.13	27°15.16		279.1	276.6°	11.1	2786	51029	12997.8			
248/2130Z	57°09.99	27°25.78		279.3	273.6°	11.2	2760	51089	12995.8			
248/2200Z	57°10.41	27°36.43		279.3	274.9°	11.1	2788	51182	12995.2			
248/2230Z	57°11.15	27°47.14		279.4	274.4°	11.1	2786	51270	12995.3			
248/2300Z	57°11.47	27°58.2		279.6	275.1°	11.1	2760	51374	12998.3			
248/2330Z	57°12.39	28°08.91		279.7	277.4°	11.0	2730	51399	13002.2			
249/0000Z	57°13.15	28°19.49		279.8	276.1°	11.5	2709	51371	12999.5			New Day = 249. Change Watch
249/0030Z	57°14.01	28°30.21		279.8	275.8°	11.8	2673	51211	13007.4			
249/0100Z	57°15.0	28°41.2		279.8	276.6°	11.9	2757	51208	13006.0			
249/0130Z	57°15.87	28°52.44		279.9	276.3°	10.5	2815	51308	12990.0			
249/0200Z	57°16.44	29°00.82		280	277.9°	9.9	2665	51442	12994.1			
249/0230Z	57°17.06	29°09.78		280.1	277.3°	10.0	2643	51356	13013.7			
249/0300Z	57°17.82	29°20.75		280.3	278.6°	10.1	2668	51542	13006.0			
249/0330Z	57°18.3	29°28.32		280.4	276.9°	10.0	2205	51463.7	13018.2			
249/0400Z	57°19.1	29°37.3		280.6	276.9°	9.8	2352	51817.1	13021.1			Change Watch
249/0430Z	57°19.7	29°46.2		280.8	275.1°	12.0	2451	51582.6	13019.5			
249/0500Z	57°20.1	29°59.1		281.1	275.1°	11.9	2391	51547.1	13024.6			
249/0530Z	57°20.4	30°09.2		281.4	275.6°	11.9	2372	51623.1	13024.2			

249/0800Z	57°21.5	30°21.1	281.9	275.8°	11.9	2311	51368.9	13033.3	
249/0830Z	57°22.2	30°32.4	282.2	274.1°	11.9	2243	51926.6	13031.7	
249/0700Z	57°23.6	30°43.1	282.8	273.9°	11.9	2452	51584.9	13029.5	
249/0730Z	57°23.6	30°53.2	283.6	273.3°	11.9	2376	51609.5	13038.6	
249/0800Z	57°24.2	31°04.3	284.5	275.6°	11.8	1934	51628.2	13053.3	
249/0830Z	57°24.5	31°15.4	285	275.3°	11.0	2069	51841.5	13064.1	
249/0900Z	57°25.3	31°26.3	286	276.1°	11.1	2634	51633.9	13026.1	
249/0930Z	57°26.5	31°19.3	287.4	275.9°	11.0	2650	51864.7	13012.4	
249/1000Z	57°27.2	31°48.3	289.2	274.9°	10.9	1781	51.597.2	13045.4	
249/1030z	57°28.1	31°58.3	277.4	273.8°	11.1	1954	51280	13050.4	
249/1100z	57°31.0	32°06.3	304.3	303.8°	11.1	1624	52080.4	13044.8	
249/1130z	57°34.3	32°15.2	304.9	301.8°	10.9	1793	52003.9	13049.5	
249/1200z	57°36.6	32°23.1	306.4	300.9°	10.9	1762	51189.7	13058.7	
249/1230z	57°39.4	32°31.3	306.5	301.6°	10.7	1155	50891.1	13074.4	
249/1255z					7.9				
249/1300z	57°42.2	32°38.3	317.4	304.1°	5.9	1821	52847.4	13043.2	
249/1320z									
249/1330z	57°43.2	32°40.3	308.1	326.3°	0.9	1739		13008.7	
249/1355z	57°43.6	32°41.0							
249/1400z	57°43.4	32°40.6	280.4	046.3°		1634		13004.4	
249/1430z	57°44.0	32°41.0	280.4	043.4°		1656		13005.1	
249/1500z	57°44.4	32°41.0	200.5	054.0°		1640		13005.1	
249/1523z	57°44.6	32°40.9							
249/1530z	57°44.1	32°41.6	200.5	209.1°		1627		13006.7	
249/1553z	57°43.3	32°42.1				1665			
249/1600z	57°43.3	32°41.1	200.5	066.5°		1665		13002.2	
249/1630z	57°43.5	32°40.6				-1700			
249/1700z	57°43.5	32°40.5	201.4	129.6°		1765		13004.4	
249/1730z	57°41.6	32°41.4	27.8	226.1°	9.8	1708		13035.1	
249/1800z	57°38.5	32°47.4	36	222.4°		2284		13012.5	
249/1830z	57°35.5	32°53.5	38.5	223.6°	9.8	2375		13003.7	
249/1900z	57°32.8	32°59.4	41.5	224.9°	9.9	2046		13008.1	
249/1930z	57°30.1	32°56.8	32.5	044.6°	10.0	2053		12934.2	
249/1936z	57°31.1	32°54.5	30.3	045.9°	10.0	2089		12949.7	
249/2000z	57°33.6	32°49.8		042.8°	10.2	2031		12951.7	
249/2030z	57°37.3	32°43.1	46.6	042.3°	10.2	1763		12961.3	
249/2100z	57°41.1	32°36.5	48.5	045.3°	10.2	1439		12985.9	
249/2130z	57°44.7	32°29.8	50.6	040.8°	10.2	1504		13006.6	
249/2141z	57°46.0	32°27.2	198.8	040.1°		1532		12999.6	
249/2147z	57°46.8	32°26.1	209.8	014.9°		1524		12997.3	
249/2200z	57°40.8	32°28.0	169.5	254.3°	10.4	1593		13055.6	
249/2212z	57°47.2	32°31.5	117.4	229.1°	10.4	1622		13057.1	
249/2230z	57°45.3	32°35.8	78.1	222.3°	10.5	1541		13046.2	
249/2300z	57°41.4	32°45.4	59.4	221.8°	10.3	1789		13032.8	
249/2301z	57°41.3	32°32.5							
249/2330z	57°43.1	32°42.0	69.8	057.9°	3.8	1670		12983.5	
249/2346z	57°43.5	32°41.2				1720			
249/2354z	57°43.5	32°41.3				1622			
250/0000z	57°43.3	32°41.2	70.6	113.6°	0.6	1594		13005.0	
250/0020z	57°43.3	32°41.0				1638			
250/0045z	57°43.24	32°41.1				1682			
250/0103z	57°43.44	32°41.25	69.9	098.6°		1692		13006.1	
250/0120z	57°43.3	32°41.1				1633			
250/0130z	57°43.3	32°41.1	69.4	145.3°	0.4	1634		13004.9	
250/0144z	57°43.3	32°41.1				1635			
250/0200z	57°44.18	32°41.8	76.2	026.8°	4.3	1578		13018.9	
250/0230	57°44.20	32°41.63	76.8	162.6°	0.2	1570		13005.9	
250/0233z	57°44.20	32°41.63				1570			
250/0255z	57°44.1	32°41.4							
250/0300z	57°44.1	32°41.1	76.6	159.9°	0.2	1549		13005.4	
250/0326z	57°44.1	32°41.1		158.4°					
250/0330z	57°44.1	32°41.1	76.5	161.0°	0.6	1567		13004.9	

Change Watch

Change Watch

Magnetometer being recovered
Magnetometer switched off
Mag in; 3.5kHz deployed; start SVP
13nm from WP1. Approaching site
On Station. start SVP

SVP coming up
End of Probe station

Deployment of Chipper - Station 1
Change Watch
Chipper hit bottom (?)
Chipper on board
on SIMRAD survey course to A

Alter course at A - to D

Alter course at D - to C

Starting turn at WP C
Slow turn to Port

Way point B

End SIMRAD survey at WP A; to WP 1

On Site (WP 1) for Chip
WP 1 Chipper deployed
NEW DAY - changed Watch
Chipper on Bottom
Chipper on Board - NO ROCKS!
Re-deploy Chipper
Chipper hit Bottom

Chipper Up

Dredger Deployed
Pinger attached and Deploying

Dredger on Bottom; 0.6knots; no Depth
Dredging for 15 mins; max wire out=1675m

250/0352z	57°43.6	32°41.2				1561	
250/0354z							
250/0358z							
250/0400z	57°43.5	32°41.1	74.7	158.1°	0.4	1632	13003.7
250/0435z	57°43.34	32°40.53	72.3	157.3°		1700	13003.5
250/0505z	57°44.19	32°42.50	338.9	137.3°	1.3	1766	13002.3
250/0510z	57°44.17	32°42.43	289	167.3°	0.5	1736	13000.6
250/0538z	57°44.19	32°42.49	289	156.6°		1746	13003.7
250/0600z	57°44.19	32°42.52	78.5	171.4°		1756	13003.2
250/0606z	57°44.21	32°42.53	78.5	174.3°		1773	13002.6
250/0627z	57°44.10	32°41.35		220.4°	0.3	1583	
250/0648z							
250/0700z	57°44.14	32°41.34	99.7	196.3°		1559	13004.5
250/0723z	57°44.14	32°41.34	99.7	195.4°		1584	13004.4
250/0804z	57°44.11	32°41.32	109	148.4°		1504	13004.4
250/0828z	57°44.2	32°41.5	109.6	240.1°	0.1	1559	13007.5
250/0840z	57°44.2	32°41.6	271.6	198.3°	0.2	1561	13006.2
250/0900z	57°44.1	32°41.6	271.6	230.3°	1.0	1522	13005.5
250/0910z	57°44.0	32°41.7	271.6	227.9°	0.6	1560	13006.5
250/0944z	57°43.8	32°42.09	11.5	232.6°	0.8	1594	13004.9
250/1002z	57°44.9	32°42.3	11.5	001.1°	7.5	1711	13001.6
250/1038z	57°45.9	32°41.3	202.2	071.6°		1600	13006.7
250/1045z	57°45.9	32°41.01				1622	
250/1104z	57°45.8	32°41.1				1621	13006.3
250/1112z	57°45.88	32°41.03				1622	
250/1129z	57°45.91	32°40.94				1623	
250/1151z	57°47.64	32°41.41				1823	13016.7
250/1200z	57°47.65	32°41.37				1832	13006.6
250/1206z	57°47.6	32°41.36				1818	
250/1230z	57°47.4	32°41.3			0.2	1838	13007.6
250/1234z	57°47.3	32°41.3				1832	
250/1253z	57°47.4	32°41.2				1815	
250/1300z	57°47.4	32°41.2	182.6	074.5°	3.3	1825	13005.0
250/1316z	57°47.5	32°40.1				1734	
250/1329z	57°47.5	32°40.1				1735	13005.2
250/1353z	57°47.5	32°40.1				1733	
250/1400z	57°47.5	32°40.1			0.1	1735	13004.6
250/1409z	57°47.5	32°40.1				1733	
250/1428z	57°47.5	32°39.1				1943	
250/1430z	57°47.5	32°39.1	199.2	280.6°	0.4	1945	13001.1
250/1442z	57°47.5	32°39.1				1947	
250/1500z	57°47.5	32°39.1			0.4	1941	13003.1
250/1506z	57°47.5	32°39.1				1939	
250/1523z	57°47.5	32°39.1				1926	
250/1530z	57°47.5	32°39.3	304.4	315.6°	0.7	1920	13005.5
250/1600z	57°50.5	32°43.5	304.4	293.6°	3.5	1634	13041.3
250/1606z	57°50.49	32°43.43	304.4	256.6°	0.3	1668	13020.6
250/1626z	57°50.47	32°43.46	304.4	294.6°		1611	13017.5
250/1648z	57°50.51	32°43.47				1612	
250/1700z	57°50.41	32°43.22	304.4	119.3°	6.4	1646	13019.5
250/1722z	57°50.29	32°40.46				1888	13012.1
250/1744z	57°50.29	32°40.51	304.4	274.6°	0.2	1878	13010.9
250/1813z	57°50.30	32°41.05				1898	13011.7
250/1843z	57°50.33	32°38.49	304.4	266.3°	0.2	1780	13009.7
250/1859z	57°50.31	32°38.53	304.4	273.4°		1788	13007.9
250/1923z	57°50.32	32°39.05	304.4	276.4°		1785	13008.1
250/2000z							13002.4
250/2007z	57°50.35	32°36.54				2238	
250/2100	57°49.8	32°36.6	304.4	254.3°	0.4	2237	13000.4
250/2105	57°50.3	32°36.6	304.4	255.4°		2227	
250/2112	57°50.27	32°36.72				2241	
250/2117	57°50.34	32°36.8				2238	

Hawling due to few bites before
Several Chunky oneel (1650-1800)
Dredge off Bottom; hawling at 60m/min

Dredge on deck but lost dredge bag. Proceed to WP3 to chip

Chipper Deployed
Chipper hit Bottom

Chipper on Deck
Dredge 2 deployed
Cable on Winch tangled; stopped paying cable at 65m

Redeployed Dredge; Flinger at 200m from Dredge
Change Watch; Dredge on Bottom; Heading due W over site
Mid Dredge
End of Dredge (Hawling in)

Off the Bottom
Dredge on Deck; To WP 4

At WP 4
Chipper Deployed; (NB Angle Grinding on Deck Nearby)

Chipper hits Bottom
Chipper on Deck
At WP 5

Chipper Deployed

Chipper at Bottom; Wire out 1820m
Chipper on Deck
To WP 6
At WP 6
Chipper Deployed
Chipper on Bottom

Chipper on Deck
At WP 7
Delay due to piece falling off 'A' frame
Chipper Deployed

Chipper on Bottom
Chipper on Deck
To WP 8
At WP 8
Chipper deployed
Chipper hits bottom
Chipper on deck, commencing to WP5

Chipper deployed
Chipper hits bottom
Chipper on deck, going to WP10
Chipper deployed
Chipper hits bottom
Chipper on deck, going to WP11
Change WP11 from chip to dredge, change watch
Dredge deployed ,hdg 258°

Wire out: 2404. Dregde on bottom
Dredging. Hdg 274 at 0.6kn
Dredge off bottom (Hauling in)

250/2200	57°50.4	32°37.45	304.4	260.3°	0.5	2165	13004.6
250/2224	57°50.54	32°37.76				1949	
250/2236	57°50.57	32°37.73		034.3°	4.0	1940	
250/2300	57°49.6	32°33.5				2254	12964.6
250/2349	57°44.3	32°25.4	304.4	220.0°	9.9	1368	
251/0000	57°42.9	32°27.5	304.4	218.0°	10.2	1110	13065.8
251/0030	57°39.09	32°33.2	304.4	219.0°	9.8	1105	13063.8
251/0100	57°35.3	32°39.4	304.4	220.0°	9.8	1698	13033.9
251/0130	57°31.5	32°44.5	304.4	221.0°	9.8	1993	13019.0
251/0200	57°27.6	32°51.0	304.4	211.0°	9.7	1584	13021.3
251/0230	57°24.3	32°56.5	304.4	221.6°	9.8	1307	13026.7
251/0300	57°27.6	33°00.1	304.4	272.6°	6.1	1872	12992.4
251/0301	57°27.6	33°00.3				1825	
251/0304	57°28.01	33°00.3				1844	
251/0313						1830	
251/0330	57°27.6	33°00.3				1796	12973.8
251/0348	57°27.6	33°00.3		262.3°	0.2	1825	
251/0401	57°27.6	33°00.4				1795	12974.6
251/0407	57°27.6	33°00.4				1870	
251/0428	57°28.08	33°01.08	304.4	267.4°		1719	12975.4
251/0508	57°28.09	33°01.29				1804	
251/0055	57°30.32	33°00.10		264.3°		1820	12977.9
251/0634						1817	
251/0641	57°30.28	33°00.18		269.8°		1816	12976.6
251/0657	57°30.33	33°00.24		249.3°		1809	12977.7
251/0739	57°31.08	32°54.42				2051	12990.2
251/0750							
251/0800	57°31.12	32°54.52		276.1°		2102	12984.3
251/0821	57°31.3	32°55.09				2181	
251/0857	57°31.29	32°54.29		126.0°		2047	
251/0900	57°31.32	32°54.19		125.0°		2053	12980.7
251/0916	57°31.48	32°57.71		110.0°	0.5	2060	
251/0919	57°31.45	32°53.62				2156	
251/0924	57°31.49	32°53.53					
251/0931	57°31.54	32°53.40		104.0°	0.5	1966	
251/0939	57°31.57	32°53.5				2052	
251/0944	57°31.60	32°53.03				2153	
251/0955	57°31.59	31°52.72					
251/0958	57°31.59	32°52.64				2073	
251/1000	57°31.62	32°52.62		086.0°	0.2	1884	12983.9
251/1043	57°31.75	32°51.49		091.1°	0.5	1930	
251/1152	57°30.46	33°00.06		272.0°		1805	
251/1200	57°30.47	33°00.09		270.0°		1809	12975.8
251/1209						1809	
251/1234	57°30.50	33°00.13		272.5°		1814	12978.0
251/1240	57°30.50	33°00.10		268.8°	0.4	1805	
251/1305	57°30.51	33°00.31		270.4°	0.6	1805	12979.4
251/1310	57°30.53	33°00.43		272.4°	0.6	1970	
251/1330z	57°30.70	33°01.03		272.4°	1.2	1886	12979.3
251/1345z	57°30.83	33°01.44		272.8°	0.4	2100	
251/1350z							
251/1400z	57°30.09	33°02.13		223.4°	8.3	2256	12979.4
251/1430z	57°28.48	33°09.31		261.6°	9.4	1891	13017.0
251/1448z	57°30.16	33°10.17		039.1°	10.0	1847	12964.1
251/1500z	57°31.62	33°07.31		044.8°	10.1	2018	12962.1
251/1530z	57°35.48	32°59.75		046.3°	10.1	2080	12963.6
251/1600z	57°39.05	32°52.62		040.1°	10.1	1602	12971.6
251/1630z	57°42.40	32°75.88		042.6°	10.1	2866	12973.4
251/1700z	57°46.11	32°38.37		045.9°	10.1	1932	12977.5
251/1730z	57°49.80	32°31.4		043.9°	10.1	1942	12978.2
251/1800z	57°51.53	32°27.28		277.3°		1798	13015.8
251/1847z	57°51.53	32°27.29		266.6°	0.2	2230.5°	13006.1

Dredge coming on board
Starting Simrad survey to WP E

At WP E. Turning

Heading towards W.P. F

Gone through WP F, turning around and heading for WP 12

At WP 12 - Dredge
Dredge deployed
Attatching pinger

Dredge at bottom

Dredge hauled up, slowly moving to WP 13
Dredge off bottom. Hauling in @60m/min
Dredge on deck
Chipper deployed
Stopped at 1751m to steady chi[[er
Chipper hit bottom
Chipper on deck. Heading to WP 14
Dredge deployed
Pinger attatched at 200m

1900m wire out. Winch stopped . starting turn
Paying out cable till d hits bottom. WP 14= 1 cable to

Wire out 2402m. Dredge on bottom
Paying out more wire to 2450m
Wire out =2563. Bites on Strainmeter
Winching in
Paying out - large bite
Dredge snagged on bottom
GPS crashed
Wire out 2071. Dredge off bottom

Dredge on deck
At WP 13
Dredge deployed
Pinger on
On station WP 13
Dredge on bottom
Hauling in
Dredge off bottom

Dredge on Deck
To WP G

At WP G

Change Watch

Reach WP H, head for WP 15
On WP 15, deploying dredge, 1821 pinger attached at 200m
Dredge on bottom, WO = 1967.° SIM 500 out (depth=1798)

251/1905z	57°51.92	32°27.8			2207.5'	13009.9	Hauling in
251/1925z	57°51.9	32°27.93			1773'	13005.9	Off the bottom
251/2000z	57°51.50	32°28.11	262.3°		1782	13006.7	Pinger detached, change watch
251/2004z	57°51.81	32°28.18			1819		Dredge on deck, hdg to WP 16
251/2053z	57°53.08	32°24.73			1871		At WP 16
251/2100z	57°53.04	32°24.76	257.0°	0.1	1926	13013.7	
251/2101z	57°53.03	32°24.76			1871		Chipper deployed
251/2126z					1862		Wire out=1720, stopping for 5 mins
251/2131z					1863		Wire out=1724, final drop
251/2133z	57°52.99	32°24.93			1865		Chipper hits bottom. Wire out=1891, rpm=120
251/2153z	57°52.99	32°25.03			1865		Chipper on deck
251/2200z	57°53.06	32°25.09	338.6°	3.9	1859	13011.8	
251/2214z	57°53.26	32°25.75			1700		At WP 17
251/2218z	57°53.20	32°25.75			1709		Chipper deployed, pause in deployment at wire out=1577
251/2249z	57°53.22	32°25.92			1737		Chipper hits bottom, wire out=1769
251/2300z	57°53.24	32°25.90	237.9°		1724	13011.6	
251/2308z	57°53.17	32°25.85			1740		Chipper on deck
251/2345	57°53.18	32°25.71			1796		Dredge deployed on WP 17.
252/0000z	57°53.22	32°25.84	230.9°		1766	13012.7	
252/0025z	57°53.34	32°25.8	248.3°		1721	1310.9	Wire out 1851. Dredge 100m off bottom. GPS playing up.
252/0031z	57°53.34	32°25.8	244.1°	0.5	1722		Speed > 0.5n
252/0043z			230.4°	0.6	1734		Wire out > 1920
252/0046z	57°53.3	32°26.09	233.9°	0.5	1736		Hauling in
252/0050z	57°53.28	32°26.13	234.9°	0.6	1637		(Wire out 1714)
252/0100z	57°53.13	32°26.3	231.3°	0.8	1802	13012.2	
252/0129z	57°52.83	32°26.63	260.6°	0.7	1876	13010.1	Dredge on deck
252/0134z							Increasing speed Underway to WP 18
252/0155z	57°54.78	32°30.42	245.3°	4.0	2232		Approaching WP 18
252/0158z	57°54.81	32°30.53	260.6°	0.2	2305	13017.2	On station, WP 18. Dredge deployed
252/0208z	57°54.83	32°30.45	227.3°	0.5	2224		Pinger attached at 200m
252/0222z	57°54.72	32°30.67	256.6°	1.0	2281		Wire out 395m
252/0227z	57°54.72	32°30.83	262.4°	0.6	2315	13006.0	Wire out 776m
252/0255z	57°54.74	32°30.71	248.4°	0.6	2290		Wire out 2348m, hauling in to 1300m
252/0257z				0.8			3.5 kHz shows sediment bottom. Increase spedd to 0.9n
252/0300z	57°54.75	32°30.8	247.3°	0.9	2308	13004.1	
252/0306z	57°54.72	32°30.99	264.4°	1.5	2305		Moving W to foot of wall
252/0314z	57°54.75	32°31.41	256.3°	1.0	2317		Speed decrease to 1.o n
252/0330z	57°54.8	32°31.94	256.9°	1.0	2000		
252/0340z	57°54.84	32°32.19	255.9°	0.5	2018		Speed decrease to 0.5 n. Dredge on bottom
252/0346z							knibbles, and then more knibbles
252/0349z	57°54.86	32°32.22	257.6°	0.5	20.21.5		Hauling in from 2304, Wire out 2280. More bites.
252/0400z	57°54.93	32°32.31	259.6°	0.4	2005	13006.2	
252/0402z	57°54.93	32°32.31	259.3°	0.1	2020		Dredge off bottom w/d 2050
252/0444z	57°55.10	32°32.17	263.4°	0.4	2043	13006.2	Dredge on deck
252/0500z	57°55.19	32°32.16				13010.8	
252/0542z	57°55.06	32°25.20	252.6°		1649	13016.0	Dredge deployed, pinger @ 200m
252/0618z	57°55.08	32°25.23	276.6°	0.2	1635	13016.8	Dredge on bottom, 0611z-hauling in
252/0645z	57°55.11	32°25.48	265.6°		1638	13017.7	Dredge off bottom, dredge across flat top of AVR
252/0716z	57°55.16	32°26.09	263.6°	0.4	1630	13018.0	Dredge on deck
252/0744z	57°56.11	32°25.28	255.9°		1641	13024.4	Dredge deployed, pinger @ 200m
252/0800z	57°56.12	32°25.34	206.9°		1808	13020.7	Change of watch
252/0820z	57°56.10	32°25.20			-1660		Dredge on bottom, SIMRAD not working properly due to dredge angle
252/0825z	57°56.05	32°25.20	232.8°	0.5	-1660		Dredging 1633m wire out
252/0841z	57°55.98	32°25.54					Hauling in
252/0859z	57°55.89	32°25.77			-1660		Dredge off bottom 1685m wire out
252/0900z	57°55.87	32°25.83	248.9°	0.4	1590	13017.3	Depth from 3.5kHz
252/0937z	57°55.5	32°26.55	320.0°	3.0	1746		Dredge on deck
252/1000z	57°56.9	32°23.34	001.0°	8.3	1885	12994.5	
252/1022z	57°57.31	32°25.05			1450		At WP21
252/1029z	57°57.29	32°25.16			1454		Dredge deployed
252/1100z	57°57.28	32°25.29	245.0°		1465(ES)	13022.4	
252/1105z	57°57.29	32°25.32			1480(ES)		Dredge on bottom, 1617m wire out

252/1108z	57°57.26	32°25.33	251.0°	0.6	1490(ES)				Dredging, 1780m wire out
252/1116z	57°57.19	32°25.46	254.0°	0.7					Hauling, dredge off bottom
252/1200z	57°57.00	32°26.33	254.0°	0.2	1740	13021.5			Dredge on deck, Chanmge of watch
252/1222z	57°56.59	32°26.10	256.0°		1854				Slowing to approach WP22
252/1227z	57°56.72	32°26.67			1924				On station WP22
252/1230z	57°56.72	32°26.54	256.3°			13033.3			Dredge deployed, pinger @ 200m
252/1233z	57°56.43	32°26.28							
252/1300z	57°56.46	32°26.39	267.2°	0.3	1990	13027.7			1648m wire out,stopped-paying out
252/1308z	57°56.43	32°26.4			1990				dredge off bottom heading towards scarp in east.
252/1312z			254.9°		1940				increase speed to 1knt
252/1316z			259.6°						Dredge on bottom, 1700m wire out
252/1328z	57°56.40	32°27.10	259.9°	1.0	2070				1764m wire out. Hauling in
252/1339z	57°56.40	32°27.30	256.1°	0.7					Getting some big bites
252/1342z									Dredge off bottom, W.O.=1715, hauling in
252/1346z	57°56.40	32°27.50			1850				Dredge on deck
252/1419z	57°56.24	32°28.40			1850				Depth from SIMRAD. Stop while crane in use.
252/1430z	57°56.22	32°28.4	259.1°		1846	13022.1			Moving to WP23
252/1444z				6.0					On stn. WP23
252/1500z						13025.3			
252/1530z	57°56.13	32°24.05	260.9°	0.4	1752	13026.6			Dredge deployed
252/1539z	57°56.13	32°24.06	259.9°	0.4	1831				Watch change
252/1600z	57°56.16	32°24.07	243.3°		1850	13025.1			Dredge on bottom w/o 1850
252/1616z	57°56.17	32°24.05	241.9°		1836	13023.2			Dredge off bottom w/o 1612
252/1650z	57°56.11	32°24.39	261.1°	0.6	1575(ES)	13026.7			
252/1700z	57°56.13	32°24.44	271.6°		1580	13025.0			Dredge on deck, continuing to WP24
252/1723z	57°56.07	32°24.59	253.6°	0.2	1590(ES)	13023.3			Dredge deployed, pinger attached 200m
252/1755z	57°57.25	32°21.20	246.9°	0.5	1685(ES)	13007.2			
252/1800z	57°57.22	32°21.17	266.1°	0.1	1697	13024.0			Dredge hits bottom, W.O.=1788
252/1830z	57°57.26	32°21.2			1660(ES)				Start hauling at 1860z, W.O.=1925
252/1849z	57°57.30	32°21.52			1698				W.O.=1500m, dredge off bottom
252/1900z	57°57.20	32°21.70	255.0°	0.5	1692				
252/1935z	57°56.52	32°22.06			1807				
252/2000z	57°56.32	32°20.02	290.0°	2.6	1662	13006.2			On station. Chipper deployment
252/2011z	57°56.29	32°20.55	186.8°		1680	13031.5			Stop chipper @ 1350m wire out
252/2035z	57°56.26	32°20.60	264.5°		1567				Chipper at bottom.Wire out =1624
252/2041z	57°56.22	32°20.55	260.0°		1563	13024.8			
252/2100z	57°56.17	32°20.64	276.0°		1590	13027.9			Chpper on deck
252/2104z	57°56.19	32°20.67	252.0°		1586				On dredge station 26
252/2145	57°56.37	32°19.83	233.0°	0.2	1666	13035.0			Dredge deployed
252/2148z	57°56.30	32°19.82	261.2°	0.6	1666				
252/2200z	57°56.25	32°19.40	266.6°	0.6	1675	13022.5			Dredge on bottom.Pinger at 200m. Wire out=1775
252/2222z	57°56.24	32°20.21	273.4°		1675	13023.7			Pinger 50m off bottom. Wore out=1825
252/2223z	57°56.22	32°20.30	271.4°		1675	13023.6			Wire out+1855m max
252/2231z	57°56.14	32°20.60	241.1°	1.8	1705				Dredge off bottom
252/2241z	57°55.97	32°20.48	244.1°	1.2	1735				
252/2300z	57°55.66	32°21.19	244.3°	1.1	1961				Dredge on Deck
252/2312z	57°55.40	32°21.57	243.3°	0.8	1927	13022.1			To WP 27 : Change shift
253/0000z	57°57.07	32°22.28	026.6°	7.5	1822	13012.3			
253/0030z	57°59.27	32°21.59	259.6°	7.6	1819	13059.2			At Wp 27
253/0036z	57°59.14	32°22.15	269.6°	1.6	1564	13041.7			
253/0040z	57°59.14	32°22.15	267.0°	0.6	1559		Slight scatter	Strong return	Dredge deployed
253/0047z	57°59.16	32°22.30	279.6°		1568				Pinger attatched at 200m
253/0100z	57°59.22	32°22.32	269.6°		1545	13027.9			
253/0114z	57°59.22	32°22.44	262.9°		1560				Stop wire, WO=1342
253/0121z	57°59.22	32°22.44	256.0°	0.1	1550		Scatter-40m		Restart paying out. WO=1412m
253/0127z	57°59.15	32°22.58	262.0°	0.4	1544				Restart paying out.
253/0135z	57°59.13	32°22.60	253.0°		1540		Scatter -20m	Sharp	Dredge on bottom. WO=1754m
253/0152z	57°59.14	32°22.93	269.0°	0.4	1555	13030.1			Hauling in
253/0158z	57°59.14	32°22.93	269.0°	0.4	1570				Nibble @WO 1726. Bottom falling away
253/0208z	57°59.2	32°23.3	270.0°	0.8	1550	13030.9			Dredge off bottom. WO=1600
253/0230z	57°59.29	32°23.95	258.0°	1.3	1646	13030.7			
253/0240z	57°59.22	32°24.22	261.2°	1.8	1725				Dredge on deck

253/0300z	57°59.16	32°24.45	255.0°	0.5	1790	13027.0
253/0321z	57°59.26	32°19.82	271.0°	0.1	1622	13026.7
253/0334z	57°59.27	32°19.94	280.0°		1602	
253/0400z	57°59.3	32°22.08	266.0°	0.2	1621	13028.6
253/0420z	57°59.35	32°20.38			1588	
253/0434z	57°59.17	32°20.31	254.5°	0.3	1560	13029.5
253/0507z	57°59.02	32°20.49	277.0°		1730	13027.0
253/0553z	57°59.27	32°16.18	274.0°	0.8		13031.3
253/0629z	57°59.32	32°16.26				
253/0649z	57°59.32	32°16.67				
253/0703z	57°59.14	32°16.77	255.0°	0.5		130291.0
253/0748z	57°58.43	32°17.11	248.0°		1720	13027.0
253/0831z	58°00.13	32°16.2	253.0°		1664	13036.5
253/0838z	58°00.1	32°16.24	265.0°	0.6	1660	
253/0900z	58°00.02	32°16.64	269.0°	0.4	1652	13028.9
253/0914z	58°00.02	32°16.73	275.0°	0.1	1625	
253/0917z	58°00.02	32°16.85	263.0°	0.8	1625	
253/0924z	57°59.96	32°19.03	264.0°	0.1	1800	13030.3
253/0935z	57°59.84	32°19.27	261.0°	0.4	1775	
253/1000z	57°59.86	32°19.96	269.9°	0.7	1650	13031.5
253/1012z	57°59.84	32°20.31	266.4°	0.3	1661	13031.2
253/1029z	58°00.17	32°20.40	267.4°	0.1	1660	13032.1
253/1100z	58°00.16	32°20.48	270.9°		1672	13028.5
253/1106z	58°00.13	32°20.43	273.0°		1672	13027.7
253/1127z	58°00.10	32°20.61	265.8°		1676	13028.8
253/1157z	58°01.56	32°20.79	259.6°		1793	13038.4
253/1206z	58°01.53	32°20.95	276.9°		1764	13029.2
253/1246z	58°01.50	32°21.08			1820	
253/1250z				0.6		
253/1255z					1800	
253/1257z					1820	
253/1300z	58°01.48	32°21.43	266.9°	0.6		
253/1304z	58°01.46	32°21.48				
253/1313z	58°01.46	32°21.72	267.6°	0.3	1650	
253/1320Z			269.3°	0.6	1650	13030.4
253/1346z						
253/1350z	58°01.24	32°22.47			1905	
253/1400z	58°01.25	32°22.38	276.3°	0.8	1905	13024.9
253/1415z	58°01.41	32°23.44	269.0°	0.8	1815	13033.4
253/1429				9.0		
253/1430	58°01.45	32°22.03	092.0°	9.4	1785	13001.4
	58°01.34	32°20.58			1800	
253/1500	58°01.42	32°20.59	018.8°	6.0		13030.4
253/1519	58°01.42	32°20.60			1800	
253/1530z	58°01.51	32°21.0			1803	
253/1600z	58°01.31	32°21.01	272.1°		1791	13026.7
253/1618z	58°01.56	32°21.04	236.1°		1798	13029.7
253/1621z	58°01.50	32°21.12			1795	
253/1623z						
253/1626z	58°01.48	32°21.31			1782	
253/1629z	58°01.48	32°21.31		0.6	1787	
253/1631z	58°01.48	32°21.31				
253/1634z	58°01.30	32°21.36		0.8	1802	
253/1636z	58°01.30	32°21.36				
253/1638z	58°01.30	32°21.36				
253/1641z	58°01.30	32°21.36				
253/1653z	58°01.46	32°21.55	262.0°		1789	
253/1700z	58°01.46	32°21.50	270.1°	0.4	1043	13026.9
253/1729z	58°01.56	32°21.56	269.9°	0.1	1622	13028.6
253/1753z	58°01.44	32°19.62	265.9°	0.4	1653	13025.6
253/1936z	58°01.27	32°19.51	268.8°		1647	13029.1
253/1957z	58°01.46	32°19.51				

U/W to WP 28
At WP 28. Dredge deployed.
Pinger at 200m
Dredge on bottom. WO-1810m
Hauling in
Dredge off bottom
Dredge on deck
Dredge deployed
Dredge on bottom. WO=1631m
Start hauling in

Dredge on deck
At WP 30.
Dredge deployed
Dredge on way down
Dredge on bottom. WO=1905m
WO = 2000m
Start hauling. Many bites
Dredge off bottom. WO=1660
Hauling up dredge
Dredge on deck
On site chipper deployed
Chipper paused at 1450m
Chipper on bottom- wire out 1705m
Chipper on deck
On WP32
Deploying dredge
Dredge on bottom
Wire out 1950m, pinger at 50m
Hauling- wire out 1938m
Paying out- wire out 1962m

Hauling - large bites
Dredge off bottom - wire out 1850m
No lation - fiddling with computer
Pinger off
Dredge on deck. Stay on stn.-engine troubles

rigging up CTD. stalk barnacle pulled up with last dredge
increasing speed to re occupy WP32

on site 32 again awaiting deployment of CTD
still waiting CTD deployment
deploying CTD
exact position plotted on map C2 as +
near bottom with CTD
tow yoing W/O1534
drifting due south, hauling 100m
stop hauling start veering
stop winch W/O 1553, (tow-yoing)
haul 100m (tow yoing)
heading west, W/O 1608 still hauling, tow - yoing
stop winch W/O 1642, tow -yoing
veering 200m
300m west from 1631z
pay out to 10m from bottom
10m off bottom, W/O 1640, start hauling

CTD on deck
on station- delay to fix winch
chipper deployed
chipper stopped at 1401m W/O to steady

253/2000z	58°01.50	32°19.86	305.3°		1633	13029.2			
253/2005z	58°01.52	32°19.83	253.0°		1655		strong actrad echo		chipper hits bottom
253/2022z	58°01.47	32°19.74			1642				chipper on deck,hdg to WP33a
253/2038z									BRAM MAKES THE COFFEE
253/2100z	58°02.52	32°17.04	230.0°	1.0	1679	13039.2			
253/2109z	58°02.40	32°17.56			1730		weak, scattered	scattered	at WP33a
253/2116z	58°02.40	32°17.48			1666		weak, scattered	scattered	Dredge deployed
253/2123z	58°02.41	32°17.47			1659		weak, scattered	moderate scatter	Pinger attached at 200m WO
253/2155z	58°02.41	32°17.43			1665				WO 1700m, dredge on bottom
253/2157z	58°02.43	32°17.44			1652		Sediments?	weak, scattered	WO 1834m, pinger 50m off, start dredge
253/2200z	58°02.43	32°17.48	304.0°	0.8	1646	13030.7			Dredging
253/2207z	58°02.47	32°17.67			1705		Very weak, scattered	weak, scattered	WO 1834m, hauling in, heading to WP34
253/2220z	58°02.49	32°17.84			1681		Very weak, scattered	weak, scattered	Dredge off bottom, WO1699m
253/2254z	58°02.68	32°18.11			1615				Dredge on board
253/2300z	58°02.76	32°18.21	308.0°	1.9	1616	13032.1			
253/2354z	58°01.59	32°14.95			1659				At WP34
254/0000z	58°01.59	32°15.03	308.0°		1677	13032.9	Spread over 30m	scattered	Change watch
254/0008z	58°01.64	32°15.09	336.0°	0.1	1615*				Chipper deployed (*NB, depth of 3.5 kHz reads ~1560)
254/0028z	58°01.53	32°15.17	315.0°		1550		bimodal	scattered	2 reflections, at 1550m and 1750m (fault scarp side echo)
254/0031z	58°01.55	32°15.19			1552				chipper 200m off bottom
254/0036z	58°01.56	32°15.19	311.0°	0.1	1547		fairly sharp at 1550m	sharpish	hit bottom, WO 1650
254/0102z	58°01.51	32°15.14	295.4°		1604				Chipper on deck
254/0106z			028.0°	6.0					To WP 35
254/0132z	58°02.82	32°14.33	305.0°	0.1	1656	13033.0	spread 1650 to 1680m	mod	At WP 35, chipper deployed
254/0156z	58°02.73	32°14.34			1649		spread 1640 to 1690		200m off bottom, w/o 1450
254/0203z	58°02.71	32°14.39			1649	13032.8	spread 1650-1680	mod	on bottom, w/o 1656
254/0227z	58°02.69	32°14.51			1637	13034.9			chipper on deck
254/0233z			284.0°	5.0					to WP 36
254/0251z	58°03.27	32°18.88	306.0°	0.1	1660	13057.5			on station at WP 36
254/0257z	58°03.20	32°18.97			1655		weak	good	dredge deployed
254/0305z	58°03.23	32°18.90			1648	13057.5			pinger attached at 200m
254/0332z	58°03.29	32°18.84	290.0°	0.5	1655		weak	mod	dredge on bottom, w/o 1710
254/0340z	58°03.28	32°19.08			1660				paying out to 1835m
254/0346z	58°03.27	32°19.28	290.0°	0.7			scattered weak	weak	w/o to 1845
254/0349z	58°03.29	32°19.33	290.0°	0.7	1680				note depth increasing, hauling in
254/0353z	58°03.27	32°19.51	290.0°	0.4	1715		mod		little nibbles, w/o 1800
254/0355z	58°03.27	32°19.55			1721				more nibbles, one bite to 3 tonnes, w/o 1780
254/0358z	58°03.27	32°19.60		0.5	1730				bite, w/o 1760
254/0400z	58°03.28	32°19.64	290.0°	0.6	1770		mod		off bottom, w/o 1746
254/0407z									change watch
254/0437z	58°03.39	32°20.04	320.9°	0.4	1770	13028.8	mod/weak over 100m		dredge on deck
254/0500z	58°03.97	32°16.71	075.6°	6.6	1750	13005.1			
254/0529z	58°04.41	32°13.99	272.8°		1580	13035.2			
254/0559z	58°03.96	32°13.99	260.9°		1580	13030.5	mod		dredge deployed, pinger at 200m
254/0616z	58°04.07	32°14.30			1600		weak to mod		dredge hit bottom, w/o 1660 to max 1755
254/0627z	58°04.17	32°14.52	301.6°	0.5	1660				hauling in dredge
254/0700z	58°04.53	32°14.76			1610		strong for 20m		dredge off bottom, w/o 1610
254/0726z	58°04.22	32°12.41	304.3°		1699	13033.2	mod/strong over 60m		dredge on deck, weak link broken
254/0758z	58°04.38	32°12.81	296.3°	0.4	1690	13032.5	mod/strong over 70m		dredge deployed
254/0811z	58°04.53	32°13.04			1670		mod/wk		dredge hit bottom, w/o 1700 to max 1864
254/0835z	58°04.53	32°13.00			1645		wk over 160m		Dredge hauling in:WO=1864
254/0900z	58°04.66	32°13.35	316.8°	0.1	1680	13033.2	wk over 140m		Dredge off Bottom; WO=1655
254/0910z	58°04.73	32°13.46			1655		wk over 105m		
254/0100z	58°04.52	32°11.80	294.3°	0.3	1719	13032.9	wk,scattered over 25m		Dredge on Deck Mud in Pipe + glass
254/1055z	58°05.28	32°12.43	301.0°		1588				On WP 39 Deploying Dredge
254/1102z	58°05.24	32°12.42	302.0°		1588	13032.5	wk over top 30m	wk	
254/1104z	58°05.26	32°12.42							Pinger Attached at 200m
254/1131z	58°05.31	32°12.69			1575		wk over 30m	wk	Dredge on Bottom: WO=1609
254/1134z	58°05.29	32°12.62			1570				dredging:WO=1756
254/1141z	58°05.34	32°12.69	308.0°		1588				Hauling in
254/1159z	58°05.40	32°12.95	309.0°		1588				Dredge off Bottom
254/1230	58°05.55	32°13.14	309.0°	0.6	1603	13032.9			

254/1232z	58°05.57	32°13.20			1630				Dredge on Deck
254/1255z	58°06.72	32°11.80			1640		spread over 175m	signal = -17dB	On WP 40
254/1314z	58°06.63	32°12.11	306.0°		1597			good	Dredge deployed
254/1350z	58°06.68	32°12.34	336.0°		1610		strong	good	Dredge on Bottom: WO=1661
254/1352z	58°06.68	32°12.34							Stopped paying out at WO=1798
254/1400z	58°06.78	32°12.35	313.0°	0.8	1621	13031.0	strong	sig =-19dB	
254/1410z	58°06.87	32°12.51	310.0°		1680		wk		Hauling in
254/1419z	58°06.96	32°12.62	330.0°	0.3	1720		spread over 10m		Dredge off Bottom:WO=1728
254/1458z	58°07.50	32°13.57	308.0°	0.9	1920				Drudge on Deck
254/1505z	58°07.60	32°13.63	310.0°	0.7	1583				To WP 41
254/1536z	58°07.85	32°10.83	275.0°	0.1	1605	13040.0	mod		At WP 41: Chipper deployed
254/1606z	58°07.77	32°11.18			1585				Chipper on Bottom WO=1618
254/1630z	58°07.47	32°11.38	294.0°		1653	13034.5		sig= -19dB	Chipper on Beard
254/1704z	58°09.47	32°10.20	301.0°		1644	13035.6	mod/strong over 20m	sig= -15dB	Dredge Deployed
254/1738z	58°09.45	32°10.23			1640				Dredge hit Bottom WO=1715 (max 1800)
254/1754z	58°09.64	32°10.44							Hauling in
254/1805z	58°09.57	32°10.61	307.0°		1680	13036.0	wk/mod over 50m	sig= -17dB	Dredge off Botoom: WO=1702
254/1842z	58°10.16	32°11.19			1865		wk/mod over 150m	sig =-20dB	Dredge on Deck
254/1900z	58°10.48	32°08.59	081.0°	8.7	1757	13002.0			
254/1919z	58°10.31	32°07.27	305.0°	0.1	1790		wk over 300m	sig= -21dB	Dredge deployed
254/1856z	58°10.40	32°07.26			1772				Dredge hit Bottom: WO=1998
254/2003z	58°10.38	32°07.40			1760		wk	sig = -21dB	WO=2123
254/2015z	58°10.49	32°07.48	311.0°		1705		wk		Hauling in
254/2044z	58°10.66	32°07.94	311.0°		1630				Dredge off Bottom: WO=1700
254/2117z	58°10.90	32°08.17	312.0°		1680				Dredge on Deck: GPS down
254/2200z	58°09.22	32°08.61	152.0°	9.9	1830	13019.0			
254/2226z	58°07.77	32°03.14	035.0°	9.9	1823				At WP I - starting SIMRAD survey
254/2230z	58°08.30	32°02.24	033.0°	9.8	1924	13006.2			
254/2300z	58°12.05	31°56.62	035.0°	10.1	1531	13020.4			
254/2330z	58°15.91	31°50.53	037.0°	10.1	1397	13031.0			
255/0000z	58°19.89	31°44.47	031.0°	10.1	1704	13035.5			
255/0023z	58°22.84	31°40.00	034.0°	10.2	1618	13041.6			At WP J
255/0032z	58°24.12	31°38.59	078.0°	7.0	1438	13049.4			Heading to WP K
255/0108z	58°20.95	31°36.50	219.0°	9.7		13088.7			At WP K
255/0130z	58°17.84	31°41.22	219.3°	10.0	1414	13091.4			
255/0200z	58°14.21	31°47.19	220.0°	9.8	1878	13076.9			
255/0230z	58°10.35	31°52.97	220.1°	9.8	1634	13077.8			
255/0300z	58°06.20	31°59.44	220.0°	9.8	1698	13073.3			
255/0307z			219.3°	10.0	1696				Gone through WP L
255/0327z	58°04.82	32°00.62			1720				Turning out of WP L, was hdg to WP 44 but now hdg to WP I
255/0400z	58°07.73	32°03.23	352.6°	8.1	1856	13044.1		sig=-27dB	On WP I, hdg to WP 44
255/0438z	58°10.98	32°03.88	311.6°		1626	13037.5	mod/strong over 200m	sig=-16dB	dredge deployed at WP 44, pinger attached at 200m w/o
255/0521z	58°10.95	32°03.99			1620		mod/strong over 100m	sig=-19dB	dredge on bottom, w/o=1705 to max 1766
255/0540z	58°11.11	32°04.18			1660			sig=-18dB	hauling dredge in
255/0549z	58°11.05	32°04.31			1700		strong over 50m	sig=-15dB	dredge off bottom, w/o=1700
255/0627z	58°11.51	32°04.47	330.4°	0.5	1751			sig=-18dB	dredge on deck, on route to WP 45
255/0644z	58°11.98	32°04.42	319.8°	0.2	1550	13037.9			dredge deployed
255/0724z	58°11.98	32°04.50			1560		weak over 200m	sig=-19dB	dredge hit bottom, w/o 1630 to max 1732
255/0744z	58°12.19	32°04.53							hauling in
255/0754z	58°12.29	32°04.48	330.9°	0.5	1610		mod/weak over 150m	sig=-19dB	dredge off bottom, w/o 1640
255/0809z	58°12.37	32°04.51	333.4°		1625	13037.6	weak over 150m	sig=-17dB	change watch
255/0839z	58°12.40	32°04.55	326.6°		1660		weak over 140m	sig=-18dB	dredge on deck
255/0900z	58°11.61	32°03.91	085.8°	0.4	1684	13022.2			
255/0932z	58°12.59	32°00.83	326.6°	0.9	1785	13041.2	mod/weak over 130m		At WP 46, dredge deployed, pinger attached at 200m w/o
255/1000z	58°12.70	32°00.93	345.0°	0.4	1796	13036.3	mod/weak + weak ectring		
255/1014z	58°12.59	32°00.94	314.0°		1789		mod/weak, ectrd		dredge on bottom, w/o 1911
255/1018z	58°12.63	32°00.91	326.0°		1787		mod/weak over 150m	sig=-17dB	starting dredge, w/o 1970
255/1035z	58°12.62	32°00.91	334.0°		1805(ES)		mod/weak over 150m	sig=-16dB	hauling in, w/o 1970
255/1048z	58°12.66	32°00.91	326.0°		1776		mod/weak over 150m	sig=-17dB	dredge off bottom, w/o 1832
255/1128z	58°13.24	32°01.12	348.1°	0.1	1746	13037.2	weak over 160m		dredge on deck
255/1149z	58°13.61	32°02.08	347.0°		1731		v weak over 150m	sig=-19dB	At WP 47
255/1157z	58°13.61	32°02.08	332.6°		1732		v weak over 250m		dredge deployed

255/1200z	58°13.62	32°02.07	333.9°	0.4	1736	13037.0	v weak over 250m		change watch
255/1253z	58°13.67	32°02.25	339.0°	0.4	1740	13036.6	strong, some ecatter over ~20m	sig=-12dB	dredge on bottom, w/o 1758
255/1238z	58°13.71	32°02.19	339.0°	0.5	1715				w/o to 1905
255/1245z	58°13.77	32°02.21	340.0°		1720		strong, some ecatter over ~20m	sig=-12dB	hauling in
255/1303z	58°13.81	32°02.41	344.0°		1715		strong, some ecatter over ~20m	sig=-20dB	dredge off bottom
255/1335z	58°13.98	32°02.22	342.1°		1745	13038.3	strong, ecatter over 355m	sig=-25dB	
255/1340z	58°14.02	32°02.21	344.0°		1705				dredge on deck
255/1353z	58°14.09	32°02.22	103.0°	5.2					hdg to WP 48
255/1425z	58°13.90	31°59.81	353.0°	0.3	1546		strong over 25m	sig=-15dB	chipper deployed
255/1450z	58°13.95	31°59.86	350.0°	0.2	1540		strong over 25m	sig=-16dB	chipper on bottom, w/o 1547
255/1510z	58°13.90	31°59.94			1550		v strong over 350m	sig=-16dB	chipper on deck, hdg to WP 49
255/1533z	58°14.66	31°14.66	061.7°	7.6		13022.4	fairly weak returns	sig=-19dB	
255/1546z	58°15.42	31°55.34			1753				on site WP 49
255/1552z	58°15.44	31°55.42	334.1°		1748		weak over 450m		dredge deployed
255/1600z	58°15.45	31°55.46			1750	13044.3			
255/1627z	58°15.30	31°55.49			1710		mod over 3/4 second	sig=-19dB	dredge hit bottom, w/o1639 to max 1936
255/1644z	58°15.73	31°55.42							hauling in dredge
255/1658z	58°15.67	31°55.44	358.9°	0.4	1760	13041.2	mod over 100m	sig=-17dB	dredge off bottom, w/o 1820
255/1735z	58°16.33	31°55.20					mod over 150m	sig=-17dB	dredge on deck
255/1803z	58°15.59	31°58.96	347.6°	0.1	1479	13055.3		sig=-20dB	At WP 50, dredge deployed
255/1830z	58°15.51	31°58.85	348.6°		1479	13041.4	weak over 300m	sig=-18dB	
255/1838z	58°15.54	31°58.97	344.8°		1471		mod over 50m	sig=-20dB	dredge hit bottom, w/o 1715 max
255/1912z	58°15.96	31°59.04			1545				dredge off bottom, w/o 1549
255/1949z	58°16.21	31°59.22	344.9°	0.2		13037.6	mod over 100m	sig=-18dB	dredge on deck
255/2000z	58°16.50	31°59.49	330.0°	1.2	1746	13046.7	strong over 150m	sig=-17dB	change watch
255/2007z	58°16.59	31°59.66			1734				On site WP 51
255/2011z	58°16.58	31°59.67	358.0°		1771		strong over 150m	sig=-18dB	deploying dredge
255/2047z	58°16.54	31°59.66			1725(ES)		strong over 150m	sig=-19dB	dredge on bottom, w/o 1771
255/2100z	58°16.58	31°59.73	001.9°		1725(ES)	13042.8	strong over 150m		
255/2126z	58°16.85	31°59.53			1745(ES)		strong over 150m		dredge off bottom, w/o 1721
255/2204z	58°17.17	31°58.85							dredge on deck
255/2246z	58°17.95	31°55.28			1887		hyperbolae, strong over 150m	sig=-17dB	At WP 52, deployed chipper
255/2300z	58°17.99	31°55.19	006.3°		1876	13039.1	flat, mod over 150m		
255/2323z	58°18.00	31°55.17			1885		flat, mod over 60m	sig=-20dB	chipper hits bottom, w/o 1930
255/2342z	58°18.01	31°55.07			1870				chipper on deck
256/0000z	58°17.64	31°53.21	063.3°	4.4	1779	13026.7			change watch
256/0011z	58°17.76	31°52.70	043.0°		1665	13039.7	sctrd over 50m	sig=-20dB	At WP 53, chipper deployed
256/0047z	58°17.75	31°52.61	047.0°		1652		triple return @ 1855,1685 and 1740	sig=-18dB	hit bottom, w/o 1740
256/0100z	58°17.75	31°52.50	046.0°		1664	13039.2			
256/0116z	58°17.75	31°52.43	046.0°		1680				chipper on deck
256/0121z									hdg to WP 54
256/0134z	58°19.11	31°52.32	024.0°		1630	13038.8	strong @ 1650m	sig=-18dB	on WP 54, chipper deployed
256/0200z	58°19.12	31°52.35			1625		double return @ 1625,1650	sig=-18dB	
256/0210z	58°19.13	31°52.30	039.0°		1629		double return @ 1625,1650	sig=-18dB	hit bottom, w/o 1671
256/0237z	58°19.19	31°52.25	040.0°		1650		sharp @ 1650m	sig=-17dB	chipper on deck
256/0300z	58°19.65	31°54.81	049.0°		1735	13043.6	spread over 1735-1765m	sig=-18dB	At WP 55, chipper deployed
256/0336z	58°19.73	31°54.87	036.0°		1735		spread over 1735-1765		hit bottom, w/o 1773
256/0405z	58°19.86	31°54.62	050.0°	0.4	1721	13043.4	spread over1735-1765m	sig=-18dB	chipper on deck
256/0430z	58°20.75	31°54.63	047.9°		1695	13046.2	weak @ 1700m	sig=-19dB	At WP 56, chipper deployed
256/0456z	58°20.84	31°54.49	090.6°		1691	13048.9	weak	sig=-19dB	200m from bottom, stationary. W/o 1500m
256/0500z	58°20.83	31°54.50	103.0°		1706	13046.1	weak	sig=-19dB	
256/0503z									hit bottom, w/o 1750
256/0530z	58°20.82	31°54.30	101.0°		1694	13046.4	weak	sig=-19dB	chipper on deck
256/0600z	58°20.36	31°51.78	091.6°		1425	13047.8	strong return	sig=-17dB	At WP 57, chipper deployed
256/0620z	58°20.34	31°51.59			1406		strong return	sig=-17dB	chipper 150m from bottom
256/0627z	58°20.33	31°51.56	078.8°		1407	13051.1	strong return	sig=-17dB	hit bottom, w/o 1430m
256/0656z	58°20.10	31°51.20			1407				chipper on deck
256/0700z	58°20.54	31°51.26	024.3°	4.0	1420	13045.1			hdg to WP 58
256/0730z	58°22.58	31°49.40	098.8°		1463	13056.9	v strong return	sig=-16dB	At WP 58, dredge deployed
256/0800z	58°22.65	31°49.50	079.0°		1459	13054.5	v strong	sig=-19dB	dredge on bottom, w/o 1683. Change watch
256/0815z	58°22.67	31°49.16							hauling in
256/0840z	58°22.64	31°48.72			1480		strong over 150m		dredge off bottom, w/o 1460m

256/0900z	58°22.69	31°48.39	081.1°	0.7	1560		13053.6	mod/strong over 150m	
256/0914z	58°22.78	31°48.01	070.3°		1575			mod/strong over 150m	dredge on deck, weak link broken
256/0926z	58°23.23	31°48.38							hdg to WP 59
256/0936z	58°23.28	31°47.97			1584			weak/mod over170m, hyperbolae	sig=-19db At WP 59, dredge deployed
256/1000z	58°23.30	31°47.85	101.3°	0.7	1520		13055.4	mod over 170m	
256/1009z	58°23.25	31°47.76	077.0°		1519			strong over 200m	sig=-18dB dredge on bottom, w/o 1540
256/1012z	58°23.26	31°47.78			1521			strong over 150m	sig=-21dB starting dredge, w/o 1675
256/1023z	58°23.29	31°47.53	089.4°	0.6	1565			strong over 150m	sig=-24dB hauling in dredge, max w/o 1675
256/1036z	58°23.32	31°47.27	091.0°	0.4	1575				sig=-23dB dredge off bottom, w/o 1554
256/1100z	58°23.27	31°46.73	094.0°	0.7	1575		13050.3	strong over 150m	sig=-26dB
256/1108z	58°23.25	31°46.59			1573			strong over 150m	sig=-23dB dredge on deck
256/1149z	58°25.27	31°47.66	089.0°		1455			strong over 150m	sig=-23dB At WP 60
256/1152z	58°25.26	31°47.67			1455			strong over 150m	sig=-23dB dredge deployed
256/1200z	58°25.28	31°47.64	068.0°	0.2	1411		13058.6	strong over 150m	sig=-23dB change watch
256/1224z	58°25.31	31°47.57	102.0°	0.5	1410		13059.4	sharp	sig=-22dB dredge on bottom, w/o 1480 to max 1580
256/1249z	58°25.28	31°47.44	070.0°	0.1	1420			sharp	sig=-24dB hauling in
256/1300z	58°25.32	31°47.45	070.0°		1430		13059.6	sharp	sig=-15dB
256/1307z	58°25.38	31°47.41	075.0°		1417			sharp	sig=-13dB dredge off bottom, w/o 1420
256/1335z	58°25.30	31°47.11	086.0°	0.7	1580				dredge on deck
256/1340z	58°25.38	31°47.12	212.0°	4.1	1600		13056.4		hdg to WP M
256/1400z	58°24.09	31°46.05	267.0°	9.2	1596		13065.1		
256/1423z	58°24.48	31°45.10	037.0°	10.1	1914		13027.3		At WP M
256/1430z	58°25.36	31°43.98	037.0°	6.0	1614				slowing down, deploying magnetometer
256/1438z	58°25.75	31°43.52	039.0°	10.0	1762		13046.9		speeding up
256/1457z	58°28.13	31°39.96	038.8°	9.9	1632				Level B not displaying mag reading
256/1500z	58°28.36	31°39.66	039.4°	9.5	1580		13041.9		
256/1530z	58°32.45	31°33.84	037.4°	9.5	1246		13057.6		Still probe with level B
256/1600z	58°36.39	31°27.98	038.0°	10.3	1787		13053.6		As above, change watch
256/1630z	58°40.35	31°22.48	036.3°	10.1	1651	52999.5	13082.6		
256/1700z	58°44.19	31°17.06	037.1°	10.0	1450	53295.9	13069.9		
256/1730z	58°48.30	31°10.49	037.3°	9.4	1751	52712	13060.9		
256/1800z	58°52.63	31°05.10	039.6°	9.9	1659	52929.4	13074.1		
256/1836z	58°57.90	30°57.51	039.9°	9.9	1196	52745.8	13102.3		
256/1900z	59°00.12	30°54.24	037.8°	9.9	1257	53062.2	13105.0		
256/1930z	59°04.56	30°47.78	035.8°	10.1	1201	52416.3	13109.4		
256/2000z	59°08.35	30°42.44	033.9°	10.4	1416	52592.4	13115.4		
256/2030z	59°12.93	30°36.05	036.0°	10.1	1192	53151	13126.4		
256/2100z	59°17.03	30°29.90	035.0°	9.6	1186	52474.8	13125.0		
256/2130z	59°21.11	30°24.18	036.0°	10.0	1278	53331.4	13134.1		
256/2200z	59°25.21	30°18.13	037.0°	9.9	1242	53226.2	13134.1		
256/2230z	59°29.62	30°11.71	037.0°	10.4	1033	53016.9	13137.9		
256/2300z	59°33.36	30°06.29	038.0°	10.3	1363	52260.2	13144.4		
256/2330z	59°37.46	30°00.25	038.0°	10.2	1050	53908.8	13161.6		
257/0000z	59°41.69	29°53.88	037.0°	10.3	1030	52425.4	13171.3		
257/0020z	59°44.80	29°49.90	036.0°	10.3	863	53011	13185.0		At WP N
257/0030z	59°45.62	29°47.61	121.0°	9.8	789	53212	13183.2		Underway to WP O
257/0053z	59°42.87	29°47.20	213.0°	10.9	1001	53272	13230.6		At WP O, Maggy clock correct
257/0100z	59°31.99	29°48.69	214.0°	10.1	962	53323	13227.0		
257/0130z	59°38.03	29°54.50	212.0°	9.9	1038	53126	13210.5		Maggy problems - trouble readouts, All Os
257/0200z	59°33.83	30°00.45	212.0°	9.7	1400	53312	13194.4		
257/0241z	59°28.51	30°08.04	213.0°	9.8	1204	54246	13191.0		Maggy paper not feeding thru again
257/0300z	59°25.94	30°11.68	214.0°	10.0	1307	53264	13180.4		
257/0330z	59°22.24	30°17.32	212.0°	9.5	1413	53218	13175.5		Maggy just gone on the blink again
257/0400z	59°18.27	30°22.94	212.0°	9.8	1219	53200	13174.9		
257/0430z	59°14.66	30°28.39	213.1°	10.0	1129	52795.4	13177.9		
257/0500z	59°10.05	30°34.73	212.6°	9.7	1236	52744.6	13167.6		Maggy paper still jamming
257/0530z	59°06.21	30°40.18	216.8°	10.0	1085	53463.3	13104.4		Triff fixed maggy paper
257/0600z	59°01.86	30°46.44	213.8°	10.1	1324	52622	13157.3		
257/0630z	58°58.25	30°51.65	214.6°	9.9	1210	53543.8	13151.0		Maggy paper jammed
257/0700z	58°54.37	30°57.28	213.8°	10.2	1275	53359.8	13142.7		Maggy paper jammed
257/0730z	58°50.32	31°02.98	215.1°	9.8	1602	52910.1	13126.3		Maggy paper still out of action
257/0800z	58°46.36	31°08.62	215.1°	10.1	1662	52646	13110.0		Maggy paper still out of action

257/0830z	58°42.13	31°14.70	212.3°	9.5	1453	52875	13108.3			Start Roll number 2 on Maggy
257/0900z	58°38.24	31°20.24	212.3°	9.5	1453	53816.6	13114.9			
257/0930z	58°34.24	31°25.03	214.9°	9.9	1437	53133.7	13106.2			
257/1000z	58°30.44	31°31.37	213.0°	9.9	1764	52697.5	13096.9			
257/1030z	58°26.46	31°37.12	214.0°	10.0	1366	53601.8	13097.5			
257/1100z	58°22.16	31°42.91	214.9°	9.8	1604	52634.2	13085.6			WP P, turn started
257/1130z	58°21.76	31°38.04	036.0°	10.0	1747	53230.3	13035.7			Went through WP Q sometime here-not noted at the time
257/1200z	58°25.81	31°32.68	034.0°	10.3	1596	53633.9	13045.0			change watch
257/1230z	58°30.29	31°26.49	037.5°	9.5	1618	53349	13049.9			
257/1300z	58°34.39	31°20.66	035.9°	10.3	1585	53399	13056.8			
257/1335z	58°38.84	31°14.55	035.6°	9.6	1451	53992.3	13066.4			
257/1400z	58°42.62	31°09.92	034.9°	9.9	1420	53555.1	13070.8			
257/1430z	58°46.19	31°04.60	035.9°	10.2	1402	53381.8	13072.9			
257/1500z	58°50.08	30°59.11	036.8°	10.1	1434	54276	13082.7			
257/1530z	58°54.08	30°53.64	035.3°	10.0	1228	53209	13092.3			
257/1600z	58°58.23	30°47.79	036.9°	10.0	1329	52802.2	13101.4			change watch
257/1630z	59°02.05	30°42.45	033.6°	10.0	1396	53710	13108.6			
257/1700z	59°06.00	30°36.95	032.9°	10.1	1223	53571.3	13115.1			
257/1730z	59°09.50	30°31.65	036.9°	9.8	1279	52872.2	13116.3			
257/1800z	59°14.03	30°25.76	037.6°	10.0	1184	53522	13127.9			
257/1830z	59°18.12	30°19.92	035.1°	9.9	1315	53320.7	13128.6			
257/1900z	59°22.44	30°14.05	037.3°	9.8	1188	53299.3	13133.2			
257/1933z	59°26.87	30°07.75	034.9°	10.0	1313	53771.5	13135.2			
257/2000z	59°30.37	30°02.97	034.9°	9.8	1184	53895.7	13145.2			
257/2030z	59°34.47	29°57.07	036.3°	10.1	1256	52897.3	13147.3			
257/2100z	59°38.67	29°51.26	036.9°	9.9	1131	53918.4	13162.6			
257/2130z	59°42.83	29°45.56	019.4°	10.0	926	53717.1	13177.3			
257/2200z	59°45.03	29°32.99	220.9°	9.8	1012	52646.2	13243.6			
257/2230z	59°41.53	29°58.12	213.4°	9.9	1035	52783	13212.3			
257/2300z	59°37.43	30°04.02	212.0°	10.0	1261	52905.2	13204.0			
257/2330z	59°33.35	30°09.55	213.0°	9.9	1366	52779.1	13191.7			
258/0000z	59°29.74	30°15.57	212.3°	10.2	1315	52315.1	13188.5			
258/0030z	59°25.57	30°21.67	215.0°	9.9	1311	52061	13178.5			
258/0100z	59°21.72	30°27.40	215.0°	9.9	1204	52573	13179.7			
258/0130z	59°17.85	30°33.29	213.0°	10.1	1266	52444	13177.4			
258/0200z	59°13.97	30°38.95	212.0°	10.1	1156	52305	13172.0			
258/0230z	59°09.69	30°44.58	215.0°	10.0	1025	52761	13170.0			
258/0300z	59°05.82	30°50.09	215.0°	10.0	1419	51977	13157.2			
258/0330z	59°02.08	30°55.62	214.6°	9.9	1392	52066.9	13151.5			
258/0400z	58°58.30	31°01.48	215.3°	9.8	1384	51679.7	13142.2			
258/0430z	58°54.44	31°07.30	213.9°	10.0	1503	52318.3	13132.2			
258/0500z	58°50.36	31°13.24	212.9°	10.4	1388	51984.2	13126.6			
258/0530z	58°46.66	31°18.47	213.3°	10.1	1323	52588.5	13122.3			
258/0600z	58°42.52	31°24.51	213.9°	10.2	1487	52525.5	13119.5			
258/0630z	58°38.82	31°29.86	213.8°	10.4	1633	52439.7	13109.9			
258/0700z	58°34.59	31°35.90	213.8°	10.2	1643	51888.5	13104.1			
258/0730z	58°30.70	31°41.60	213.6°	10.3	1596	51923.7	13099.9			
258/0800z	58°26.63	31°47.51	213.3°	10.1	1611	52207.1	13086.5			End of line WP T
258/0807z	58°25.30	31°49.24								Maggie off and retrieved
258/0905z	58°24.46	31°43.19	071.9°	7.3	1665		13019.1			
258/1011z	58°24.64	31°40.97	096.6°		1396		13058.7			Bow thruster broken for last 3 hrs
258/1040z	58°24.52	31°43.27	083.9°	1.6	1881			weak over 150m	-16dB	No bow thruster- deploying drdge ~1km W of WP61
258/1048z	58°24.55	31°42.99	100.8°	0.6	1670			weak over 150m	-24dB	Pinger at 200m
258/1100z	58°24.57	31°42.82	107.1°	0.6	1626		13057.4	v.weak over top60m,weak over~75m	-6dB	Approaching WP61 at 0.9 knts
258/1125z	58°24.39	31°42.13	091.1°	0.4	1664			strong over top 75m, weak over next 75m	-31dB	Hauling in to avoid hitting bottom too early
258/1135z	58°24.48	31°41.58	078.8°	0.4	1676			-"-	-43dB	dredge on bottom WO 1760m
258/1137z	58°24.51	31°41.55	074.8°	0.1	1383			-"-	-20dB	Starting 15min dredge WO 1760m
258/1147z	58°24.59	31°41.27	081.1°	0.5	1370			-"-	-21dB	Hauling in
258/1200z	58°24.68	31°40.97	089.5°	0.5	1405		13061.2	mod/strong over 50m	-23dB	
258/1218z	58°24.73	31°40.57	091.4°	0.8	1875			mod/strong over 100m	-21dB	Dredge off bottom WO 1550m
258/1230z	58°24.80	31°40.29	090.6°	0.6	1970		13062.8	strong over 100m		
258/1245z	58°24.98	31°39.64	096.0°	0.6	1255		13016.0	strong		Dredge on deck

258/1308z	58°24.96	31°39.10	094.0°	0.8	1250	13062.5	strong	-56dB	
258/1400z	58°33.19	31°33.87	086.0°	1.8	1403	13070.9		-21dB	nearly at WP62
258/1406z	58°33.26	31°33.76	103.0°	0.6	1385		scattered over 30m	-21dB	At WP 62 deploying dredge
258/1430z	58°33.27	31°33.48	111.0°	0.6	1305			-24dB	Stop paying out WO 1274m, creeping up to way point
258/1500z	58°33.27	31°32.74	091.0°	1.1	1073	13080.1	1 ref.1050m, 2 at 1080m		On bottom, WO 1445m
258/1515z	58°33.42	31°32.47	119.0°	1.3	1101		strong	-18dB	Hauling - lots of nibbles
258/1530z	58°33.43	31°31.97	100.0°	1.2	1116	13080.0	strongely hummocky!	-18dB	Big bite 4.5Tonnes
258/1535z	58°33.44	31°31.81	100.0°	1.3	1124				Mega-bite!! 5 Tonnes
258/1600z	58°33.70	31°31.42	056.1°	0.2	1350	13081.9	strongley hummocky	-20dB	Dredge lost - decided to do WP 62 again
258/1640z	58°33.40	31°32.07							On stn. again
258/1644z	58°33.39	31°32.73	144.4°	0.2			strongley Hummocky	-19dB	Dredge deployed
258/1653z	58°33.35	31°32.78	106.4°	0.5	1150	13087.1	-"-	-20dB	
258/1717z	58°33.19	31°32.32	120.0°	0.7	1100		-"-	-16dB	Dredge on bottom WO 1274m
258/1745z	58°33.26	31°32.07	127.0°	0.4	1150		-"-	-14dB	Dredge off bottom
258/1813z	58°33.12	31°31.53	138.3°	0.4	1283	13080.4	strong	-19dB	Dredge on deck
258/1854z	58°34.83	31°32.08	124.4°	0.6	1172	13074.8	strong over 50m	-18dB	On stn. WP63
258/1901z	58°34.84	31°31.90	138.4°		1170		v strong	-10dB	dredge deployed
258/1927z	58°34.81	31°31.85	121.6°	0.2	1167		-" -	-13dB	Dredge on bottom WO 1186m
258/1947z	58°34.70	31°31.60	126.3°	0.5	1157		v strong	sig=-13dB	hauling in, w/o 1350
258/1959z	58°34.60	31°31.25	136.8°	0.8	1163		v strong	sig=-12dB	dredge off bottom
258/2000z	58°34.65	31°31.18	144.6°	0.9	1171	13081.6	v strong	sig=-16dB	change watch
258/2028z	58°34.28	31°30.83	146.4°	0.2	1325		v strong, hyperbolae		dredge on deck
258/2058z	58°34.73	31°29.05			1794	13073.1			At WP 64
258/2118z	58°34.83	31°29.02	122.6°	0.1	1794		v strong, wavy	sig=-9dB	Dredge deployed
258/2147z	58°34.51	31°28.81			1785		v strong, multiple layers		Dredge on bottom, w/o 1820
258/2200z	58°34.46	31°28.59	116.9°	0.6	775(ES)_	13073.5	mod/strong, multiple layers		Hauling in, w/o 1965
258/2215z	58°34.31	31°28.40			1690		sad drape	sig=-20dB	Dredge off bottom, w/o 1800
258/2243z	58°33.99	31°27.96			1555				Pinger on deck, w/o 197
258/2256z	58°33.86	31°27.83	116.6°	0.2	1532		mod/strong over 120m	sig=-19dB	Dredge on deck, hdg to WP 65
258/2300z	58°33.90	31°27.61	024.3°	4.0	1448	13076.9	mod/strong over 120m	sig=-14dB	
258/2321z									3.5kHz roll changed
258/2337z	58°35.05	31°24.96			1380		mod over 150m, hyperbolae	sig=-20dB	At WP 65
258/2347z	58°34.97	31°24.86			1351		mod/strong over 90m, layered		Dredge deployed
259/0000z	58°34.94	31°24.71	093.0°	0.4	1335	13080.8	range 1335-1360	sig=-15dB	Change watch
259/0010z	58°34.98	31°24.47	096.0°	0.1	1315		triple refln @ 1330,1340 +1365m	sig=-17dB	Dredge on bottom, w/o 1380
259/0028z	58°35.01	31°24.19	111.0°	0.1	1341	13081.0	strong single refln	sig=-17dB	Hauling in
259/0040z	58°34.90	31°23.98	117.0°		1372		refins @ 1360,1400		Biting
259/0045z	58°34.90	31°23.92	119.0°	0.6	1406		refins @ 1370,1410	sig=-18dB	Dredge off bottom, w/o 1383
259/0100z	58°34.78	31°23.65	108.0°	0.4	1490	13080.1	weak	sig=-15dB	
259/0115z	58°34.76	31°23.44	110.0°		1541	13082.1			Dredge on deck
259/0126z	58°34.80	31°23.26	011.0°	4.5					Hdg to WP 66
259/0200z	58°36.00	31°22.38	011.0°	5.2	1332	13087.8			
259/0224z	58°39.59	31°21.34	083.0°	0.6	1260	13086.5	scatered over 20m	sig=-17dB	At WP 66, dredge deployed
259/0256z	58°39.62	31°20.76	103.0°	0.6	1140				W/o 1209, haul in to 1199m
259/0300z	58°39.61	31°20.68	102.0°	0.5	1135	13092.8	sharp	sig=-17dB	Dredge on bottom
259/0304z				0.5			fuzzy over 70m		Paying out wire to 1250m max
259/0316z	58°39.70	31°20.34	103.0°	0.5	1117				Hauling in
259/0326z					1115		weak over top 50, hard sub-bottoms		Dredge off bottom, w/o 1152
259/0352z	58°39.66	31°19.77	122.0°	0.3	1187				Dredge on deck
259/0400z	58°39.64	31°19.69	110.0°	0.4	1201				Hdg to WP 67
259/0445z	58°42.40	31°19.54	116.3°	0.4	1307	13087.2	fuzzy over 100m	sig=-22dB	At WP 67
259/0450z	58°42.40	31°19.53	134.6°	0.4	1250		"	sig=-21dB	Dredge deployed
259/0457z	58°42.35	31°19.49	115.1°	0.8	1207		"	sig=-23dB	Pinger attached w/o 200m
259/0518z	58°42.29	31°18.17	108.8°	0.8	1180		strong over 50m	sig=-23dB	Dredge on bottom, w/o 1325 to max 1420
259/0535z	58°42.33	31°18.80	135.0°	0.7	1180	13095.1	fuzzy over 50m	sig=-25dB	Hauling in
259/0540z	58°42.24	31°18.84			1160		weak/fuzzy	sig=-25dB	Nibbles to 3 tonnes, w/o 1359
259/0558z	58°42.12	31°18.81	134.0°	0.5	1125		weak	sig=-26dB	Dredge off bottom, w/o 1180
259/0625z	58°41.97	31°18.61	135.0°	0.5	1200	13094.9	fuzzy	sig=-22dB	Dredge on deck
259/0700z	58°43.18	31°15.90	110.0°	1.4	1625	13082.9	weak	sig=-21dB	Hdg to WP 68
259/0702z	58°43.18	31°15.81	120.0°	0.5	1642		weak	sig=-23dB	At WP 68
259/0706z	58°43.20	31°15.80	123.0°	0.6	1660		weak	sig=-22dB	Dredge deployed
259/0713z	58°43.18	31°15.71	124.0°	0.7	1719		weak	sig=-21dB	Pinger attached, w/o 200m

259/0740z	58°43.13	31°15.47	141.0°	0.2	1730	13083.4	fuzzy over 50m	sig=-26dB	Dredge on bottom, w/o 1800 to max 1837
259/0758z	58°43.06	31°15.26	127.6°	0.6	1775		weak/fuzzy	sig=-22dB	Hauling in
259/0800z	58°43.06	31°15.22	128.3°	0.4	1785(ES)	13082.4	scattered over 100m		Change watch
259/0810z	58°43.00	31°15.09			1785(ES)		mod, multiple layers over 100m	sig=-24dB	Dredge off bottom, w/o 1790
259/0857z	58°42.80	31°14.41	129.4°	0.6	1792		wk over top 100 then v strong	sig=-20dB	Dredge on deck
259/0900z	58°42.81	31°14.36	136.4°	0.3	1792		"	sig=-19dB	
259/0922z	58°42.81	31°13.41	137.6°	0.3	1561		mod, multiple refns over 100	sig=-25dB	At WP 69, deploying dredge
259/0959z	58°42.72	31°13.43	130.0°	0.4	1532		wk over top 15, strong over next 80	sig=-23dB	Dredge on bottom, w/o 1560
259/1000z	58°42.71	31°13.42	129.6°	0.1	1541	13084.2			
259/1003z	58°42.69	31°13.35	121.9°		1539				Dredging, max w/o 1690
259/1008z	58°42.70	31°13.26	119.6°	0.5	1541		Wk over top 15, mod/strong over next 80	sig=-25dB	Hauling in, w/o 1690
259/1022z	58°42.65	31°13.15	137.4°	0.7	1547		mod/strong over 40	sig=-25dB	Dredge off bottom, w/o 1545
259/1055z	58°42.50	31°12.79	100.6°	0.3	1656		mod/wk over 200	sig=-45dB	Dredge on deck, hdg to WP 70
259/1100z	58°42.52	31°12.61	125.1°	0.5	1618	13086.5			
259/1145z	58°45.65	31°11.08	125.8°	0.2	1400		mod over 250m		On stn WP70 - dredge deployed
259/1202z	58°45.58	31°11.07	137.1°	0.1	1424	13087.3	weak/mod. top 75m, weak down to 250m total		
259/1216z	58°45.61	31°10.88	121.0°		1370		mod	sig=-25dB	Dredge on bottom WO=1452, max 1578
259/1230z	58°45.63	31°10.74	120.0°		1365		spread over ~30m	sig=-28dB	Hauling in
259/1245z	58°45.66	31°10.58	110.0°		1370		mod/weak	sig=-22dB	Dredge off bottom WO=1365m
259/1322z	58°45.76	31°09.61	052.0°	4.0	1510				U/way to WP71
259/1341z	58°47.82	31°09.64	111.0°	0.4	1608	13084.3	mod-spread over 20m		At WP71 deploying dredge
259/1424z	58°47.81	31°09.10	113.0°		1673		2 reflections 1675m and 1700m	sig=-20dB	Dredge on bottom WO 1721m, max 1862m
259/1431z	58°47.79	31°09.00	115.0°	0.4	1675		sharp		Hauling in. Gravimeter playing up
259/1447z	58°47.71	31°08.76	117.0°	0.4	1656		sharp	sig=-23dB	Dredge off bottom. WO=1700
259/1452z	58°47.61	31°08.71			1650		strong over 100m	sig=-25dB	
259/1500z	58°47.62	31°08.63	116.4°	0.4	1640	13085.0	-"-	-"-	
259/1522z	58°47.48	31°08.26	115.0°	0.5	1626				Dredge on deck
259/1530z	58°47.59	31°08.23	006.0°	4.0	1569	13084.6			U/way to WP 72
259/1557z	58°49.52	31°07.40	116.9°	0.7	1375	13092.8	mod/strong over 60m	sig=-23dB	Dredge deployed
259/1626z	58°49.46	31°07.17	101.0°	0.4	1356		scattered over 100m	sig=-25dB	Dredge on bottom, w/o 1406 to max 1569
259/1645z	58°49.47	31°06.71	110.0°	0.5	1350	13090.5	mod/strong	sig=-21dB	Hauling in, nibbles upto 3 tonnes @ 1655
259/1708z	58°49.35	31°06.41	117.0°	0.2	1400		scattered over 100m	sig=-24dB	Dredge off botoom, w/o 1388
259/1737z	58°49.21	31°06.44	122.8°	0.1	1450	13092.9	mod/strong over 50m	sig=-28dB	Dredge on deck
259/1747z	58°49.11	31°06.24	114.0°	1.2	1464		mod	sig=-28dB	U/way to WP 73
259/1832z	58°46.61	31°08.82	112.0°	1.9	1649		weak	sig=-26dB	U/way to WP 73
259/1837z	58°46.62	31°08.60	108.0°	0.8	1641		weak/mod over 50m	sig=-23dB	At WP 73
259/1840z	58°46.61	31°08.61	116.0°	0.1	1652		"	sig=-22dB	Dredge deployed
259/1916z	58°46.64	31°08.31	113.6°	0.7	1585		"	sig=-22dB	Dredge on bottom, w/o 1600m
259/1921z	58°46.64	31°08.27	116.4°	0.5	1582		"	sig=-22dB	Hauling in, max w/o 1750
259/1939z	58°46.56	31°08.02	110.9°	0.1	1576	13083.6	mod over 50m		Dredge off bottom, w/o 1605
259/2000z	58°46.72	31°08.04	106.6°	0.3	1583	13085.7			Change watch
259/2008z	58°46.79	31°07.98	110.6°	0.4	1600		mod over 150m	sig=-30dB	Dredge on deck
259/2018z	58°46.85	31°07.71	102.1°	0.2	1497				U/way to WP 74
259/2100z	58°48.70	31°06.10	028.3°	7.0	1763	13076.4			
259/2200z	58°52.22	31°04.66	109.3°	2.2	1603	13094.6			WP74 abandoned until morning (0800)
259/2300z	58°53.18	31°11.46	257.0°	7.1	1497	13138.9			Continued SIMRAD survey of transition zone
260/0000z	58°51.79	31°18.67	129.0°	3.7	1511	13102.3			Force 8! Are we on the Ewing?
260/0022z	58°52.35	31°15.95	047.6°	6.8	1173	13094.2			
260/0100z	58°55.70	31°11.10	046.0°	5.2	1511	13093.3			Still force 8! Oh, we are at sea then?
260/0200z	59°00.77	31°03.42	046.0°	5.0	1553	13103.1			Heading for WP V (off axis survey)
260/0300z	59°05.8	30°56.43			1463	13116.9			
260/0332z	59°08.37	30°52.87			1401	13121.3			
260/0408z	59°07.8	30°51.18	105.3°	1.3	1372	13131.3			Still bad weather
260/0430z	59°08.38	30°49.98	106.0°	1.5	1224	13129.6			
260/0500z	59°08.39	30°48.58	108.0°	1.1	1369	13131.8			Going slowly!
260/0530z	59°08.37	30°47.05	099.8°	1.1	1137	13133.9			
260/0600z	59°08.45	30°45.46	010.6°	1.2	1063	13137.4			
260/0630z	59°08.48	30°43.45	095.8°	2.3	1151	13130.1			Force 8, gusting 9
260/0700z	59°08.58	30°41.52	093.9°	1.6	1270	13129.0			
260/0730z	59°08.72	30°39.49	096.6°	1.8	1113	13133.0			
260/0800z	59°08.84	30°37.66	097.8°	2.4	1172	13132.6			
260/0900z	59°09.13	30°33.08	097.9°	1.7	1225	13130.1			3.5kHz not working, gain switched off by accident

260/1000z	59°09.37	30°27.56	092.6°	2.0	1340	13126.5			
260/1100z	59°09.37	30°23.70	096.9°	2.1	1394	13122.0			
260/1200z	59°09.21	30°20.20	097.6°	1.4	1322	13133.7			
									Log stops for 20 hours
261/0800z	59°22.86	29°05.80	260.6°	0.5	1569	13185.2			change watch, hdg back to survey
261/0900z	59°20.35	29°25.77	242.9°	10.4	1428	13205.1			
261/1000z	59°15.26	29°45.48	239.3°	11.0	1645	13195.2			
261/1100z	59°09.80	29°04.24	240.3°	10.9	1397	13184.1			
261/1200z	59°04.38	29°23.34	239.6°	11.0	1379	13169.3			change watch
261/1300z	58°58.82	30°41.52	239.9°	10.8	1549	13160.3			
261/1403z	58°52.82	30°59.90	238.4°	10.8	1362	13152.3			
261/1415z	58°51.89	31°03.61							U/way to WP74
261/1425z	58°52.01	31°04.77	057.0°	0.6	1389	13103.8	sharp	sig=-15dB	At WP 74, deploying dredge
261/1500z	58°52.18	31°04.22	031.0°	0.3	1375	13100.7	"	sig=-19dB	Dredge on bottom, w/o 1548 max
261/1510z	58°52.20	31°04.26	058.0°	0.3	1377		"	sig=-19dB	Hauling in
261/1523z	58°52.30	31°03.86	046.0°	0.6	1390		"	"	Dredge off bottom, w/o 1400
261/1556z	58°52.57	31°02.99	060.0°	0.6	1604	13099.9			dredge on deck
261/1600z	58°52.58	31°02.90	065.0°		1605	13098.3	Spread over 20m		
261/1634z	58°50.50	31°01.17	077.0°	0.1	1044	13098.1	sctrd over 100m	sig=-16dB	At WP 75
261/1638z	58°50.49	31°01.14	086.0°		1050		"	sig=-18dB	Dredge deployed
261/1646z	58°50.44	31°01.18	062.6°		1041		Weak then sharp over 100m	sig -15db	
261/1707z	58°50.52	31°01.06	059.6°	0.4	1050	13111.6	"	sig -20db	Dredge on b ottom, WO 1092
261/1717z	58°50.54	31°00.99	069.3°	0.2	1050		"	"	Hauling in. WO max 1221m
261/1737z	58°50.56	31°00.84	072.0°		1000	13110.0	Spread over 150m	sig -24db	Off the bottom WO 1057
261/1802z	58°50.61	31°00.79	072.0°	0.2	1023	13110.8	Spread over 150m	sig -24db	Dredge on deck
261/1815z	58°50.67	31°00.36	023.0°	0.3	1060		Strong over 50m	sig -22db	U/W to WP 76
261/1847z	58°53.36	31°58.91	067.0°	0.3	1121	13110.4	Fuzzy over 150m	sig -29db	At station WP 76
261/1858z	58°53.43	31°58.83	080.0°	0.2	1141		"	sig -30db	Chipper deployed
261/1914z	58°53.39	30°58.8	080.0°	0.6	1154		Fuzzy over 100m	sig -28db	Stop winch 200m from bottom, WO 900
261/1922z	58°53.42	30°58.71	097.0°	0.6	1160	13115.1	"	sig -25db	Chipper hits bottom, WO 1125
261/1930z	58°53.37	30°58.77	067.0°		1115	13117.5			
261/1937z	58°53.39	30°58.63	072.0°	0.7	1117				Chipper on deck
261/2000z	58°54.12	30°56.43	058.4°	3.2	1083	13094.3			Heading to WP 77
261/2019z	58°54.36	30°55.84			1400		Strong over 60m		On station WP 77
261/2022z	58°54.29	30°55.85			1400		Strong over 50m	sig -24db	Chipper deployed
261/2040z	58°54.31	30°55.87			1399				Chipper stopped for five minutes WW 1203
261/2045z	58°54.35	30°55.88			1407				Drop of chipper
261/2048z	58°54.34	30°55.86			1404		"	sig -22db	Hits bottom WO 1407
261/2100z	58°54.41	30°55.84			1404	13114.6			
261/2104z	58°54.4	30°55.9			1402		"	sig -24db	Chipper on deck
261/2144z	58°56.17	30°58.36	088.6°	0.9	995		Mod strong over 150m	sig -21db	At WP 78
261/2153z	58°56.18	30°58.34			998		"	sig -22db	Dredge deployed
261/2200z	58°56.24	30°58.45	092.9°	0.2	988	13129.8	"	sig -23db	
261/2220z	58°56.21	30°58.22			972		"	sig -25db	Dredge on bottom, WO 997
261/2222z	58°56.19	30°58.23	108.3°		976		"	sig -24db	Pinger 50m off bottom WO 1139
261/2227z	58°56.18	30°58.22	091.6°	0.8	965		"	sig -22dbv	Hauling in
261/2243z	58°56.15	30°57.93			1000		Very strong over 150m	sig -19db	Dredge off bottom WO 995
261/2300z	58°56.11	30°57.80	093.9°		992	13128.9	Very strong over 75m	sig -18db	
261/2307z	58°56.08	30°57.05	104.0°	0.2	1003		"	sig -22db	Dredge on deck. 3.5kHz gone off
261/2335z	58°56.43	30°55.24							Change 3.5kHz roll
262/0000z	58°57.07	30°53.09	039.9°	4.6	1145	13118.3	Very strong over 125m	sig -24db	On way to WP79. Delay due to suspected traffic.
262/0035z	58°56.52	30°54.07	064.0°	0.5	1195	13117.8	Very sharp	sig -21db	At WP 79. Deploying dredge
262/0106z	58°56.53	30°53.53	062.0°	0.6	1195	13125.0	"	sig -20db	Dredge on bottom WO 1220, them max 1370.
262/0116z	58°56.58	30°53.23	062.0°	0.3	1160		Sharp	sig -19db	Hauling in /nibbles
262/0129z	58°56.55	30°52.76	042.0°	0.6	1120	13123.2	"	sig -21db	Dredge off bottom WO 1200
262/0156z	58°56.69	30°51.88	054.0°		1170				Dredge on deck
262/0212z									WP 80
262/0239z	58°57.95	30°56.06	030.0°	0.1	1180	13123.4	Moderate	sig -24db	At WP 80 Deploying dredge
262/0310z	58°58.15	30°55.76	022.0°	0.5	1118		"	"	Dredge on bottom WO 1190 and max 1334
262/0320z	58°58.22	30°55.63	030.0°	0.7	1185	13127.3	"	"	Hauling in Big bite. DECCA GPS gone tits up, using rimble
262/0355z	58°58.59	30°54.40	029.0°	0.8	1260	13124.5			Dredge on deck
262/0429z	58°59.50	30°55.38	019.6°	0.6	1018	13144.1	strong over 50m	sig=-23dB	At WP 81

262/0434z	58°59.52	30°55.34		000.1°	0.2	1080		"	sig=-25dB	Dredge deployed
262/0442z	58°59.51	30°55.37		016.0°	0.1	1078		"	sig=-24dB	Pinger attached @ 200m w/o
262/0500z	58°59.54	30°55.42		006.6°	0.3	1081	13128.4	"	sig=-18dB	Dredge on bottom, w/o 1100
262/0508z	58°59.65	30°55.40	81	356.0°	0.4	1079		"	sig=-16dB	Hauling in, max w/o 1237
262/0519z	58°59.64	30°55.52	81	009.6°	0.2	1075	13128.1	"	sig=-20dB	Dredge off botoom, w/o 1095
262/0546z	58°59.73	30°55.35	81	021.0°	0.2	1070		"	sig=-19dB	Dredge on deck
262/0600z	58°59.73	30°54.04		074.0°	5.2	1208	13113.5	weak over 100m	sig=-26dB	U/way to WP 82
262/0616z	58°59.97	30°52.04	82	008.0°	0.2	978		sctrd over 100m	sig=-22dB	At WP 82
262/0619z	58°59.94	30°52.13	82	013.0°	0.1	978		"	sig=-24dB	Dredge deployed
262/0627z	58°59.97	30°52.06	82	026.0°	0.8	974	13132.6	"	sig=-22dB	Pinger attached @ w/o 200m
262/0642z	59°00.06	30°52.06	82	005.0°	0.7	977		weak over 25m then strong over 75m	sig=-23db	Dredge on bottom, w/o 1015
262/0650z	59°00.13	30°52.04	82	007.0°	0.2	366		weak over 25m then strong over 75m	sig= -23db	hauling in. max w/o 1177
262/0706z	59°00.21	30°52.05	82	011.4°	0.4	1000	13131.9	weak over 25m then strong over 75m	sim= -18db	dredge off bottom, w/o 990
262/0731z	59°00.29	30°52.09	82	012.0°	0.1	1022	13132.7	strong over 50m	sim= -23db	dredge on deck
262/0802z	59°01.71	30°48.72		047.6°	4.6	1226	13111.7			change watch
262/0814z	59°02.12	30°48.08	83			1116		mod/weak, layered		At WP 83, dredge deployed
262/0852z	59°02.16	30°48.18	83			1141		mod over 150m, layered	sig=-22dB	Dredge on bottom, w/o 1150
262/0854z	59°02.23	30°48.11	83			1144		"	sig=-22dB	Pinger 50m off btm, w/o 1302
262/0859z	59°02.22	30°48.16	83			1114		"	sig=-23dB	Hauling in, w/o 1302
262/0918z	59°02.30	30°48.14	83			1159		"	sig=-24dB	Dredge off bottom, w/o 1134
262/0946z	59°02.55	30°48.13				1160		"	sig=-23dB	Dredge on deck, u/way to WP 84
262/1000z	59°02.93	30°47.66				1113	13129.2			
262/1029z	59°03.95	30°46.81	84			968		strong over 100m	sig=-30dB	At WP 84, deploying dredge
262/1047z	59°03.99	30°46.88	84			969		"		Dredge on bottom, w/o 955
262/1054z	59°04.05	30°46.86	84			1062				Hauling in, w/o 1080
262/1100z	59°04.10	30°46.81	84	038.3°	0.8	1043	13139.0	strong over top, weaker over 150m		
262/1110z	59°04.20	30°46.82	84			1000		strong over 150m		Dredge off bottom, w/o 940
262/1200z	59°03.01	30°43.75		090.9°	5.0	1097	13112.0	mod over 95m, hyperbolae		Change watch
262/1212z	59°03.25	30°42.96	85	286.0°	0.4	970	13142.0	sharp	sig=-22dB	At WP 85, deploying dredge
262/1242z	59°03.32	30°43.19	85	355.0°		960		sharp	sig=-23dB	dredge on bottom, w/o 975 max 1129
262/1252z	59°03.40	30°43.28	85	358.0°	0.6	960		sharp	sig=-22dB	Hauling in, nibblee
262/1307z	59°03.68	30°43.35	85	358.0°	0.7	996		sharp	sig=-24dB	dredge off bottom
262/1329z	59°03.98	30°43.60	85	001.0°	0.9	1126				dredge on deck
262/1400z	59°05.25	30°41.28	86	016.0°	0.2	1135	13134.0	spread over 20m	sig=-23dB	At WP 86
262/1408z	59°05.30	30°41.23	86	027.0°		1125		spread 1125-1145		Dredge deployed
262/1434z	59°05.36	30°41.14	86	030.0°	0.6	1145		spread 1135-1155		dredge on bottom, w/o 1160
262/1445z	59°05.44	30°40.98	86	028.0°	0.7	1136	13139.0	spread 1120-1155	sig=-22dB	Hauling in
262/1511z	59°05.70	30°40.37	86	027.0°	1.0	1137	13138.0	mod	sig=-26dB	Dredge off bottom, w/o 1140
262/1535z	59°05.91	30°39.79	86	029.0°		1146				Dredge on deck
262/1619z	59°06.38	30°47.25	87	016.0°	0.6	1000	13157.0	strong over 50m	sig=-20dB	At WP 87
262/1627z	59°06.40	30°47.22	87	355.0°	0.1	1004		fuzzy to strong over 50m	sig=-24dB	dredge deployed
262/1651z	59°06.41	30°47.27	87	002.8°		1007	13141.0	"	sig=-21dB	dredge on bottom, w/o 1022
262/1700z	59°06.41	30°47.19	87	002.4°	0.1	1005		"	sig=-23dB	Hauling in, max w/o 1176
262/1710z	59°06.46	30°47019	87	004.3°	0.1	1020		strong over 50m	sig=-20dB	Dredge off bottom, w/o 1027
262/1735z	59°06.52	30°47.20	87	004.0°	0.1	1022	13141.1	"	sig=-18dB	dredge on deck
262/1830z	59°09.91	30°38.59	88	006.0°	0.5	1024	13147.9	fuzzy over 50m	sig=-25dB	At WP 88
262/1833z	59°09.91	30°38.63	88	358.0°		1024		"	sig=-23dB	dredge deployed
262/1856z	59°09.97	30°38.54	88	014.0°	1.0	1012	13147.1	"	sig=-15dB	dredge on bottom, w/o 1050
262	59°10.00	30°38.6	88	358.0°	0.4	1006		"	sig=-19dB	Start hauling, max w/o 1192
262/1916z	59°10.07	30°38.63	88	003.9°	0.2	1006	13148.5	weak then strong over 75m		Dredge off bottom, w/o 1020
262/1940z	59°09.99	30°38.59	88	349.0°	0.3	1007	13148.5	fuzzy over 100m	sig=-20dB	Dredge on deck
262/2000z	59°11.03	30°35.57		052.3°	10.0	1155	13117.6			Change watch
262/2020z	59°12.25	30°33.30	89	009.7°	0.1	1314	13147.5	strong/fuzzy/mod/sctrd		At Wp 89, deploying dredge
262/2050z	59°12.31	30°33.41	89	014.4°		1879		strong over 50m	sig=-15dB	Dredge on botoom, w/o 1150
262/2052z	59°12.29	30°33.41	89	002.3°	0.4	1154		"	sig=-16dB	Pinger 50m off btm, w/o 1318
262/2057z	59°12.36	30°33.46	89	000.3°	5.8	1156		"	sig=-15dB	Hauling in
262/2100z	59°12.37	30°33.46					13146.6			
262/2110z	59°12.49	30°33.47	89	004.9°	0.1	1160		strong over 50m		dredge off btm, w/o 1180
262/2140z	59°12.67	30°33.51	89	000.3°	0.7	1174		mod over 50m	sig=-20dB	dredge on deck
262/2200z	59°12.79	30°30.19		072.1°	6.6	1053	13120.7			
262/2213z	59°13.31	30°29.40	90	359.0°	0.4	981		strong over 50m, hyperbolae	sig=-12dB	At WP 90
262/2219z	59°13.35	30°29.43	90			973		strong over 50m	sig=-12dB	Dredge deployed

262/2241z	59°13.41	30°29.49	90			966		strong over 80m	sig=-13dB	dredge on bottom, w/o 990
262/2243z	59°13.43	30°29.49	90		0.8	966		"	sig=-15dB	pinger 50m off btm, starting dredge, w/o 1131
262/2248z	59°13.48	30°29.56	90			978		"	sig=-15dB	hauling in
262/2258z	59°13.59	30°29.61	90	352.3°		1003		strong over 70m	sig=-10dB	Dredge off bottom, w/o 1010
262/2300z	59°13.62	30°29.65	90	353.4°		1004	13155.1			
262/2322z	59°13.94	30°29.96	90	330.0°		1045		strong over 60m	sig=-20dB	dredge on deck, u/way WP 91
263/0000z	59°15.32	30°34.45		357.0°	1.1	1039	13155.3			change watch
263/0012z	59°15.43	30°34.45	91	347.0°	0.3	1030	13150.4	mod	sig=-14dB	At WP 91, dredge deployed
263/0040z	59°15.62	30°34.79	91	353.0°		1056		spread 1050-1080	sig=-26dB	dredge on btm, w/o 1080
263/0043z	59°15.63	30°34.77	91	352.0°	0.7	1061				w/o to 1243 max
263/0047z	59°15.68	30°34.76	91	350.0°	0.5	1080	13150.3	mod spread 20m	sig=-27dB	hauling in
263/0100z	59°15.83	30°34.84	91	342.0°	0.1	1155	13151.2			
263/0102z	59°15.88	30°34.87	91	338.0°		1155		sharp	sig=-40dB	Dredge off bottom, w/o 1152
263/0127z	59°16.14	30°39.34	91	328.0°	0.3	1220		spread over 20m	sig=-40db	dredge on deck
263/0142z	59°16.48	30°39.73		067.0°	3.0	1217				U/way to WP 92
263/0200z	59°16.66	30°32.22		080.0°	9.0	1178	13122.7			"
263/0227z	59°17.22	30°27.25	92	344.0°	0.3	1120	13157.1	spread over 60m	sig=-24dB	At WP 92, dredge deployed
263/0255z	59°17.44	30°27.62	92	341.0°	0.3	1150		mod	sig=-23db	dredge on bottom, w/o 1220
263/0258z	59°17.44	30°27.62	92	340.0°	0.1	1192				W/o to 1364
263/0305z	59°17.57	30°27.70	92	340°	0.6	1145	13155.6	moderate	sig -24db	Hauling in
263/0321z	59°17.72	30°27.96	92	340°	0.6	1205				Dredge off bottom WO 1220
263/0346z	59°17.86	30°28.33	92	330°	0.7	1100				Dredge on deck
263/0443z	59°18.97	30°23.66	93	316.9°	0.8	1120	13150.0	moderate to strong over 25m	sig -18db	On station. Dredge deployed
263/0517z	59°19.06	30°23.73	93			1080				Dredge on bottom WO 1190. Max 1250
263/0524z	59°19.03	30°23.85	93							Hauling in
263/0546z	59°19.14	30°23.93				1070	13153.4			Dredge off bottom, WO 1034
263/0610z	59°19.25	30°24.06				1153	13154.9	Weak	sig -19db	Dredge on deck
263/0645z	59°19.47	30°24.66		343.0°	0.6	1259	13157.9	Weak	sig -11db	Bad weather start Simrad survey
263/0659z	59°18.55	30°22.48		172.0°	9.9	1257				Simrad survey
263/0730z	59°15.17	30°17.45		220.3°	10.3	1468	13160.2			
263/0800z	59°11.29	30°23.69		215.9°	10.4	1338	13165.3			
263/0830z	59°07.19	30°29.83		213.6°	10.3	1415				
263/0900z	59°02.70	30°30.92		218.0°	9.5	1576	13148.6			
263/0930z	58°58.49	30°41.79		209.9°	9.9	1536	13144.4			
263/1000z	58°54.19	30°47.67		214.8°	10.1	1433	13141.3			
263/1030z	58°57.31	30°51.06		027.3°	8.5	1320	13115.8			
263/1100z	58°54.6	30°46.8		031.8°	9.3	1442	13102.7			
263/1130z	58°58.01	30°42.00		032.3°	9.2	1513	13104.5			
263/1200z	59°01.57	30°37.03		031.9°	8.7	1492	13104.0			
263/1240z	59°06.36	30°31.2		021.0°	7.0	1294	13123.0			UW for WP 94
263/1300z	59°07.97	30°29.16		033.0°	7.8	1137	13122.0			
263/1432z	59°18.15	30°14.2		007.0°	7.9	1241	13120.0	Strong sharp bottom, little ringing , sub-bottome	sig -16db	
263/1532z				309.6°		1272	13153.7		sig -21bd	HAlf mile off WP 94
263/1540z	59°23.17	30°18.08		335.3°		1257				Clearing afterdeck for dredging
263/1600z	59°23.34	30°18.18		322.0°	0.5	1144	13155.6	Weak over 170m	sig -24db	Nearly on site, about to deploy
263/1604z	59°23.33	30°18.26	94	319.0°	0.1	1141		Weak	sig -20db	P 94
263/1632	59°23.36	30°18.58	94	335.0°	0.9	1125	13155.7	Fuzzy over 100m	sig -23db	Dredge on bottom. WO 1138
263/1641z	59°23.40	30°18.62	94	320.0°	0.3	1136		"	sig -26db	Hauling in Max WO 1292
263/1655z	59°23.43	30°18.84	94	319.0°	0.1	1160	13157.4	"	sig -24db	Dredge off bottom WO 1158
263/1723z	59°23.64	30°19.15	94	326.0°	0.7	1120		Weak over50m, then strong	sig -68db	Dredge on deck
263/1810z	59°27.86	30°15.15	95	322.0°	1.4	1060	13161.1	Strong over 50m	sig -27db	On station WP 95
263/1814z	59°27.89	30°15.30	95	325.0°	0.5	1076		"	sig -30db	Dredge deployed
263/1835z	59°28.02	30°15.62	95	330.0°		1005	13163.9	Strong over 50m	sig -22db	Dredge on bottom WO 1038
263/1844z	59°28.14	30°15.86	95	327.0°	0.5	1003		"	sig -18db	Hauling in Max WO 1170
263/1859z	59°28.24	30°15.84	95	330.0°	0.1	1007	13162.8	"	sig -14db	Dredge off bottom, WO 1020
263/1928z	59°28.49	30°16.25	95	329.0°	0.8	1100		Fuzzy	sig -83db	Dredge on deck
263/2000z	59°28.50	30°08.93		088.3°	11.1	1203	13124.9	Hyperbolae	sig -24db	
263/2020z	59°28.93	30°06.49				1067				At WP 96
263/2024z	59°28.93	30°06.55	96	323.0°		1069		Mod strong over 80m	sig -25db	Dredge deployed
263/2046z	59°29.09	30°06.66	96			995		Mod over 150m	"	Dredge on bottom, WO 1030
263/2049z	59°29.10	30°06.67	96			995		"	sig -24db	WO 1180
263/2055z	59°29.17	30°06.69	96			1007		"	sig -23db	Hauling in

263/2100z	59°29.18	30°06.73	96	337.0°	0.5	1018	13169.4			
263/2110z	59°29.26	30°06.94	96			1100		Strong then weak over 90m	sig -29db	Dredge off bottom WO 1029
263/2136z	59°29.56	30°07.37	96	344.0°		982		Mod weak over 150m	sig -58db	Dredge on deck
263/2200z	59°30.16	30°05.80		060.0°	8.6	1037	13144.4			
263/2210z	59°30.47	30°04.99	97	348.0°		1100		Strong hyperbolae	sig -24db	at WP 97
263/2215z	59°30.51	30°04.97	97	337.0°	0.7	1080		Mod to strong over 150m	sig -20db	Dredge depolyed
263/2238z	59°30.68	30°05.12	97			1012		Strong over 150		Dredge on bottom WO 1067
263/2250z	59°30.79	30°05.2	97			1004		strong -mod over 100m		hauling in
263/2300z	59°30.91	30°05.44	97	339.6°	0.1	1009	13174.6	strong over150m		
263/2308z	59°30.92	30°05.43	97			1030				w/o 1030 dredge off bottom
263/2331z	59°31.12	30°05.89	97	334.0°		1089		mod/weak over150m	sig -36db	dredge on deck
264/0000z	59°31.93	30°06.88		335.0°	1.4	1030	13173.8			change watch
264/0103z	59°35.64	30°02.04	98	327.0°	0.6	822	13180.2	strong over 150m	sig -19db	at wp 98, dredge deployed
264/0124z	59°35.81	30°02.25	98	344.0°	0.4	802		sharp	sig -14 db	dredge on bottom wo 809
264/0133z	59°35.87	30°02.31	98	331.0°	0.7	820			sig -17 db	hauling in max wo 974, nibbles and bits
264/0143z	59°35.93	30°02.59	98	325.0°		860		v v strong over 75m		dredge off bottom wo865
264/0201z	59°36.13	30°03.04	98	328.0°	0.5	952				dredge on deck
264/0205z					3.7					underway to wp99
264/0247z	59°39.00	29°58.56	99			756				at wp99
264/0253z						722				dredge deployed
264/0300z	59°39.18	29°58.70	99	321.0°	0.5	825	13194.0	sharp	sig -16 db	
264/0314z	59°39.21	29°58.93	99	333.0°	0.3	865		"	sig -7 db	dredge on bottom wo 880
264/0322z	59°39.32	29°59.08	99	330.0°	0.6	879				hauling in max wo 1086
264/0326z	59°39.50	29°59.24	99	330.0°		880		sharp		dredge off bottom, wo985
264/0355z	59°39.73	29°59.35	99	336.0°		849	13193.4	"	sig -12db	
264/0400z	59°39.93	29°59.49	99			935				dredge on deck
264/0439z	59°40.09	29°52.43	100	333.0°		898	13165.4	Weak fuzzy over 100m	sig -23db	P 100
264/0443z	59°40.10	29°52.43	100	355.0°		902			sig -19db	Dredge deployed
264/0505z	59°40.27	29°52.66	100	344.0°	0.3	935	13196.5	Scattered over 100m	sig -15db	Dredge on bottom WO 960
264/0515z	59°40.39	29°52.69	100	323.0°	0.1	920		"	sig -24db	Hauling in Max WO 1163
264/0531z	59°40.69	29°53.02	100	326.0°		911	13199.2	Hummocky over 100m	sig -15db	Dredge off bottom WO 935
264/0554z	59°40.86	29°53.52	100	327.0°	0.2					Dredge on deck
264/0618z	59°40.22	29°55.48	101	326.0°	0.1	1107		Spread over 100m	sig -10db	At bWP 101
264/0622z	59°40.26	29°55.49	101	312.0°	0.4	1126	13199.4		sig -17db	Dredge deployed
264/0647z	59°40.28	29°55.63	101	338.0°		1134		Strong layered ovewr 150m	sig -17db	Dredge on bottom WO 1175
264.0656z	59°40.35	29°55.71	101	331.0°	0.5	1136			sig -17db	Hauling in
264/0715z	59°40.56	29°55.98	101	320.0°	0.1	1150	13192.1			Dredge off bottom WO 1060
264/0744z	59°40.95	29°56.24	101	329.0°	0.2	900	13194.0	Fuzzy	sig -20db	Dredge on deck
264/0800z	59°41.61	29°54.14		055.0°	10.8	889	13187.5			
264/0828z	59°43.49	29°51.19	102			761				On station WP 102
264/0831z	59°43.51	29°51.27	102	337.0°		745		Mod over 150m-hyperbolae	sig -14db	Dredge deployed
264/0850z	59°43.66	29°51.42	102	056.0°		690		Strong over 150m, layered	sig -22db	Dredge on bottom WO 709
264/0853z	59°43.68	29°51.36	102	062.0°		691				WO 883
264/0858z	59°43.71	29°51.20	102	033.0°	0.2	701				Hauling in
264/0900z	59°43.72	29°51.19	102	034.0°	0.3	706	13205.4			
264/0910z	59°43.87	29°51.03	102	036.0°		752		Strong over 90m	sig -17db	Dredge off bottom, WO 771
264/0928z	59°44.11	29°50.70	102	037.0°	0.1	804				Dredge on deck
264/1000z	59°44.76	29°50.43		358.0°	2.4	763	13208.1			UW to WP 103
264/1021z	59°46.50	29°50.71	103	036.0°	1,1	799		Mod to strong over 80m.	sig -23db	At WP 103
264/1024z	59°46.58	29°50.65	103	054.0°		796			sig -27dB	Deploying Dredge
264/1049z	59°46.72	29°50.41	103	069.0°		775		mod over 150m		Dredge on Bottom WO=806
264/1057z	59°46.76	29°50.19	103	074.0°	1.1	784			sig= -25dB	Hauling in WO=946
264/1100z	59°46.76	29°50.16	103	077.0°	0.1	791	13204.9			
264/1109z	59°46.83	29°49.98	103	070.0°	0.4	821		mod/strong over 100m	sig= -30dB	Dredge off Botom WO=845
264/1129z	59°46.98	29°49.46	103	112.0°	0.4	854				Dredge on Deck
264/1150z	59°47.13	29°48.43		057.0°	11.1	1004				Under way to dump rock rubbish overboard
264/1200z	59°47.82	29°43.19		128.0°	4.0	1042	13180.8			Change Watch
264/1230z	59°47.83	29°47.18	104	010.0°	0.1	851		spread over 20m	sig=-23dB	At WP 104 Dredge deplored
264/1252z	59°47.93	29°47.06	104	010.0°		862				Dredge on Bottom WO=930
264/1300z	59°47.97	29°46.98	104	010.0°		858	13208.2	v.sharp over 75m		Hauling in - several bites to 3 ton
264/1330z	59°48.37	29°46.65	104	012.0°	0.4	810	13207.3			Dredge off Bottom WO=810
264/1349z	59°48.73	29°46.47	104	012.9°		839				Dredge on Deck

264/1353z										U/way to WP 105
264/1405z	59°47.59	29°47.65		??	5ish	800				Turning round to go to Correct WP 105
264/1427z	59°49.91	29°44.84	105	196.0°	0.7	720	13217.7	sharp	sig-27dB	At WP 105 Deploring Dredge
264/1452z	59°49.76	25°45.19	105	148.0°	0.6	680	13214.7			Dredge on Bottom WO=680 (max 880)
264/1502z	59°49.67	29°45.09	105	148.0°	0.5	683				Hauling In
264/1522z	59°49.53	29°44.80	105	150.0°	0.5	700		sharp	sig-15dB	Dredge off Bottom WO 700
264/1538z	59°49.21	29°44.28	105	150.0°		820				Dredge on Deck
264/1600z	59°49.91	29°42.94	106	156.0°	1.0	673	13197.1	sharp	sig-14dB	At WP 106
264/1603z	59°49.85	29°42.80	106	154.0°	0.2	668			sig-16dB	Dredge deplored
264/1620z	59°49.81	29°42.93	106	150.0°	0.1	668	13214.1		sig-18dB	Dredge on Bottom WO=684
264/1629z	59°49.75	29°42.85	106	165.0°	0.7	678			sig-17dB	Hauling In; WO=850
264/1639z	59°49.69	29°42.79	106	146.0°	0.5	670	13213.5	sharp	sig-14dB	Dredge off Bottom WO=690
264/1700z	59°49.58	29°42.64	106	151.0°		676	13213.1		sig-19dB	Dredge on Deck
264/1738z	59°51.61	29°44.06	107	150.0°	0.5	812	13198.3	hummocky	sig-18dB	At wp 107 Dredge Deployed
264/1802z	59°51.55	29°43.94	107	156.0°	0.6	796		fuzzy	sig-14dB	Dredge on Bottom WO=825
264/1813z	59°51.48	29°43.83	107	150.0°	1.2	168			sig-18dB	Hauling In WO=990
264/1826z	59°51.33	29°43.76	107	152.0°	0.3	832	13212.5	strong	sig-22dB	Dredge off Bottom WO=843
264/1846z	59°51.26	29°43.61	107	146.0°	0.4	833		fuzzy	sig-21dB	Dredge on Deck
264/1934z	59°53.87	29°37.30	108	148.0°	0.9	960	13207.7	strong	sig-18dB	At WP 108; Dredge deployed
264/1957z	59°53.79	29°37.18	108	149.0°	0.7	900		strong, layered	sig-13dB	Dredge on Bottom WO=950
264/2001z	59°53.78	29°37.05	108	151.0°	1.0	900		strong, layered over 200m	sig-16dB	WO=1099
264/2005z	59°53.74	29°37.04	108	148.0°	1.2	900			sig-14dB	Hauling In
264/2020z	59°53.59	29°36.76	108	148.0°	1.0	960		mod over 150m		Dredge off Bottom WO=924
264/2045z	59°53.31	29°36.18	108	139.0°	0.4	987		mod, layered over 150m	sig-15dB	Dredge on Deck
264/2100z	59°53.18	29°35.81		154.0°	1.1	1055	13203.1			
264/2200z	59°54.59	29°40.30		295.1°	6.1		13232.4			Wandering
264/2300z	59°55.76	29°40.63		144.9°	1.1	1122	13204.5			ditto
265/0000z	59°55.23	29°33.82		142.6°	1.7	1008	13203.9			Around + about (Andy Pandy??) Change Watch
265/0100z	59°54.78	29°34.52		154.3°	1.6	1070	13203.1			Hove to Braving the storm
265/0200z	59°53.59	29°30.96		147.8°	2.0	1061	13182.1			
265/0300z	59°51.95	29°30.01		151.6°	2.0	1270	13190.6			
265/0400z	59°50.07	29°24.09		165.3°	2.4	1342	13186.8			
265/0432z	59°48.36	29°22.44		173.0°		1447	13180.3			
265/0500z	59°47.16	29°21.51		172.0°		1358	13182.6			
265/0530z	59°45.79	29°20.33		176.9°	2.3	1398	13179.2			
265/0600z	59°44.50	29°19.27		160.6°	1.7	1405	13177.3			
265/0630z	59°42.98	29°18.30		179.1°	1.9	1291	13177.8			
265/0700z	59°45.36	29°23.53		319.9°	10.5	1335	13208.2			Heading to WP 109 to recommence Dredging
265/0800z	59°49.70	29°30.04		321.4°	10.7	1079	13221.0			Change Watch
265/0900z	59°54.99	29°38.58		245.0°	0.8	972	13224.9			
265/0928z	59°54.93	29°39.36	109	226.0°	0.6	848	13213.1	strong sctrd over 150m	sig=-12dB	dredge deployed
265/0948z	59°54.78	29°39.54	109	224.0°		843		"		dredge on bottom, w/o 855
265/0956z	59°54.78	29°39.69	109	224.0°	0.6	843		"		hauling in, max w/o 1055
265/1000z	59°54.73	29°40.04	109	225.0°		844	13216.1	"		
265/1008z	59°54.71	29°40.28	109	224.0°		873	13217.6	strong, sctrd over 100m		dredge off bottom, w/o 870
265/1032z	59°54.62	29°40.60	109	200.0°	0.4	1041	13211.0			dredge on deck
265/1100z	59°56.16	29°40.21		044.0°	11.3	1140	13198.4			
265/1133z	59°57.81	29°36.06	110	212.0°	0.2	877	13215.4	weak, sctrd over 150m	sig=-24dB	dredge deployed
265/1200z	59°57.67	29°36.11	110	209.0°	0.3	818	13212.9	strong + fuzzy over 100m		
265/1205z	59°57.67	29°36.25	110	204.9°	0.6	825		strong over 50m		dredge on bottom, w/o 847
265/1207z			110							pinger 50m from bottom, w/o 998
265/1212z	59°57.63	29°36.26	110					strong refine over 50m	sig =-18dB	hauling in
265/1225z	59°57.61	29°36.44	110			835				dregde off bottom, w/o 838
265/1231z	59°57.63	29°36.50	110	210.3°	0.5	835	13213.6	strong refine over 100m		
265/1244z	59°57.59	29°36.69	110	202.0°	0.3	961				dredge on deck
265/1250z	59°57.58	29°36.70								U/way to WP 111
265/1313z	59°57.49	29°31.30	111	208.6°	0.3	887				At WP 111
265/1316z	59°57.51	29°31.31	111			887		strong refine over 35m		dredge deployed
265/1345z	59°57.26	29°31.35	111	220.0°	0.3	920	13212.6	mod	sig=-20dB	dredge on bottom, w/o 958
265/1354z	59°57.26	29°31.43	111	201.0°	1.0	915				hauling in, max w/o 1140
265/1415z	59°57.21	29°31.40	111	201.0°	0.8	910		mod	sig=-12dB	dredge off bottom, w/o 910
265/1438z	59°57.12	29°31.17	111	197.1°	0.6	923				dredge on deck

265/1500z	59°56.91	29°30.91		319.0°	2.9	1022	13210.1			changed dredge bucket
265/1528z	60°00.06	29°28.92	112			890				dredge deployed
265/1530z	60°00.04	29°29.00	112	213..8	0.8	905	13218.8	weak over 50m, then strong over 100m	sig=-13dB	
265/1550z	59°59.98	29°29.00	112			875				dredge on bottom, w/o 972
265/1552z			112			845		weak over 25m, strong over150m		pinger 50m off bottom, w/o 1098
265/1558z			112			840				hauling in, w/o 1090
265/1600z	59°59.96	29°29.10	112			835	13220.0	mod over 180m		change watch
265/1615z	60°00.06	29°29.77	112	192.6°	0.6	830	13218.4	mod over 200m	sig=-22dB	dredge off bottom, w/o 840
265/1632z	60°00.00	29°28.37	112			900		"	sig=-20dB	dredge on deck
265/1700z	59°59.66	29°24.75	113	195.9°	0.6	930	13198.8	strong over 30m	sig=-16db	At WP113 but problem with power to A-frame..delayed
265/1744z	59°59.55	29°24.89	113	226.6°	0.3	929				dredge deployed
265/1805z	59°59.23	29°24.93	113	231.0°	0.4	936	13219.3	fuzzy over 100m	sig=-23dB	dredge on bottom, w/o 977
265/1814z	59°59.51	29°25.00	113	230.0°	1.0	969		"	sig=-24dB	hauling in, max w/o 1131
265/1832z	59°59.56	29°25.06	113	240.0°	1.0	361	13218.1	Strong	sig -21db	dredge off bottom WO 1131
265/1855z	59°53.61	29°25.18	113	206.0°	0.1	964	13218.5	fuzzy over 150m	sig -24db	dredge on deck
265/1925z	60°01.10	29°20.05	114	202.0°	0.6	865		strong	"	On station WP 114
265/1930z	60°01.03	29°19.97	114	218.0°	0.8	861	13214.6	Strong over 50m	sig -16db	Dredge deployed
265/1948z	60°01.00	29°20.11	114	233.0°	0.1	823		Strong over 50m	sig -25db	Hauling In Max WO 1048
265/1957z	60°00.99	29°20.13	114	224.0°		860		Hummocky and layered over 150m	sig -25db	
265/2000z	60°00.99	29°20.11	114	208.0°	0.4	835	13221.9			
265/2024z	60°00.67	29°20.08	114	210.0°	0.1	801		Fuzzy/strong over 130m	sig -27db	Dredge off bottom
265/2045z	60°00.38	29°20.19	114	210.0°	0.5	907		Mod weak layered over 150m	sig -37db	Dredge on deck
265/2102z	59°59.99	29°20.17		200.0°	0.7	1027	13217.0			UW to WP 115
265/2137z	60°02.41	29°23.16	115	219.0°		770				At WP 115
265/2153z	60°02.33	29°23.17	115	227.0°	0.3	784		Weak over 170m	sig -22db	Dredge deployed
265/2200z	60°02.29	29°23.23	115	222.0°		745	13227.2			
265/2211z	60°02.24	29°23.3	115	241.0°	0.6	748		Mod weak over 140m	sig -23db	Dredge on bottom WO 905
265/2216z	60°02.21	29°23.47	115	237.0°	0.3	741		mod over 80m	sig -21db	Hauling In
265/2229z	60°02.12	29°23.73	115	238.0°	0.1	808		mod over 150m, layered	sig-30dB	Dredge off Bottom WO=778
265/2257z	60°02.03	29°24.42	115	230.0°	0.5	850				Dredge on Deck
265/2300z	60°02.01	29°24.48	115	308.8°	1.4	871	13227.5			
265/2348z	60°05.08	29°15.32	116	227.0°	0.1	978				At WP 116
265/2352z	60°05.08	29°15.47	116	213.0°		974		strong over 50m	sig-17dB	Dredge Deployed
266/0000z	60°05.02	29°15.51	116	212.0°	0.5	981	13227.6			Change Watch
266/0014z	60°4.97	29°15.59	116	219.0°	0.4	963	13226.7			Dredge on Bottom WO=1000 (max 1200)
266/0025z										Hauling In; Many Bites
266/0040z	60°4.51	29°16.54	116	216.0°	0.3	1006	13229.0	sharp	sig-14dB	Dredge off Bottom WO=1020
266/0107z	60°4.36	29°17.17	116	217.6°	0.5	1042		v.strong over 50m	sig-13dB	Dredge on Deck
266/0111z										U/way to WP 117
266/0135z	60°5.64	29°19.31	117	183.0°		850	13228.0	mod	sig-16dB	At WP117 Dredge Deplored
266/0209z	60°5.56	29°19.12	117	193.0°		903		spread 875-920m	sig-19dB	Dredge on Bottom WO=845 (max 1150)
266/0220z	60°5.52	29°18.91	117	193.0°	0.3	912				Hauling In
266/0230z	60°5.44	29°18.94	117	207.0°	0.5	928	13229.0	spread over ~20m	sig-16dB	Dredge off Bottom WO=965
266/0256z	60°5.27	29°19.0	117	198.0°		932				Dredge on Deck: To WP 118
266/0314z	60°6.90	29°20.32	118			904				At WP118
266/0324z	60°6.82	29°20.52	118	220.0°	0.1	876		strong, ringing over 100m	sig-18dB	Dredge Deployed
266/0351z	60°6.78	29°20.37	118	247.0°	0.7	828	13231.0		sig-20dB	Dredge on Bottom
266/0400z	60°6.73	29°20.34	118	234.0°	0.2	900	13229.0	strong over 25m	sig-23dB	Hauling In
266/0416z	60°6.73	29°20.66	118	256.0°	0.5	864				Dredge off Bottom WO=878
266/0441z	60°6.78	29°20.89	118	261.0°	0.2	925		fuzzy	sig-13dB	Dredge on Deck
266/0531z	60°07.59	29°15.30	119	240.0°		851	13235.0			
266/0557z	60°07.59	29°15.43	119	242.0°		844	13234.0	strong	sig-16dB	Dredge on Bottom WO=870
266/0608z	60°07.59	29°15.36	119	254.0°	0.6	856			sig-18dB	Hauling In Max WO=1039
266/0622z	60°07.53	29°15.77	119	255.0°	0.4	849	13236.0			Dredge off Bottom WO=845
266/0647z	60°07.56	29°16.11	119	252.0°	0.4	972	13234.0			Dredge on Deck
266/0722z	60°08.95	29°15.30	120	256.0°	0.9	724	13236.0	fuzzy over 100m	sig-21dB	Dredge Deployed WP120
266/0740z	60°08.95	29°15.62	120	248.0°	0.2	603		strong	sig-20dB	Dredge on Bottom WO=637
266/0750z	60°08.91	29°15.79	120	251.0°	0.7	600	13238.0	strong		Hauling In WO=781
266/0800z	60°08.90	29°15.81	120	242.0°	0.3	601	13239.0			Change Watch
266/0809z	60°08.85	29°15.85	120	270.0°		601		strong over 100m - fuzzy top	sig-29dB	Dredge off Bottom WO=580
266/0827z	60°08.82	29°15.78	120	242.0°	0.1	621				Dredge on Deck
266/0845z										3.5kHz echosounder down -reason unknown

266/0900z	60°09.30	29°12.39		079.0°	11.4	591	13192.4				
266/0927z	60°08.98	29°10.99	121	253.0°	0.9	756		mod over 150m			At WP 121 Dredge Deployed
266/0946z	60°08.90	29°11.18	121			731					Dredge on Bottom WO=767
266/0954z	60°08.89	29°11.43	121			790 (ES)		mod 35m then strng for 50m			hauling in max wo904
266/1022z	60°08.81	29°11.97	121	256.0°	0.8	805 (ES)		mod over 150m			dredge on deck
266/1100z	60°11.63	29°07.62	121	326.0°	6.5	841	13213.5				heavy roll, cheese and ham
266/1114z	60°11.87	29°08.94	122	251.0°		784		hyperbolic, mod and strong over 150m			on station wp122
266/1118z	60°11.87	29°08.97	122	244.0°	0.5	775		"			dredge deployed
266/1137z	60°11.80	29°09.37	122	258.0°	0.3	832		mod over 100m	sig -23db		dredge on bottom wo870
266/1140z	60°11.80	29°09.43	122	255.0°		826		"	sig -20db		pinger 50m off bottom, wo1008
266/1145z	60°11.77	29°09.49	122	247.0°		816		"	sig -24 db		hauling in
266/1200z	60°11.68	29°09.94	122	245.0°	0.6	755	13248.2				change watch
266/1206z	60°11.58	29°10.11	122	242.0°		763					dredge off bottom wo740
266/1226z	60°11.37	29°10.35	122	212.3°		750					dredge on deck, delay due to changing dredge
266/1319z	60°13.69	29°12.20	123	223.7°	0.7	842		strong ringing over 70m	sig -24db		on station wp123
266/1326z	60°13.63	29°12.43	123	226.8°	0.1	842					dredge deployed
266/1346z	60°13.49	29°12.36	123	226.0°	0.4	847		sharp	sig -24db		dredge on bottom wo880
266/1354z	60°13.41	29°12.48	123	238.0°	0.6	819		moderate	sig -30db		hauling in max wo1028
266/1405z	60°13.27	29°12.78	123	238.0°	0.9	810		weak			dredge off bottom wo 883
266/1423z	60°13.08	29°13.15	123	238.4°		881	13229.8				dredge on deck
266/1438z											onto wp 124
266/1500z	60°14.15	29°08.27	124	064.0°	11.8	775	13217.3	moderate over 50m	sig -19db		
266/1524z	60°15.28	29°06.25	124	256.0°		530					dredge deployed
266/1537z	60°15.13	29°06.37				500					dredge on bottom wo570
266/1539z			124								pinger 50m from bottom wo657
266/1544z	60°15.09	29°06.48	124			500		strong over 100m	sig -27db		hauling wo657
266/1553z	60°15.01	29°15.01	124			500					off bottom wo562
266/1600z	60°14.95	29°06.90	124	230.0°		600	13258.9	moderate over 100m			problem with winch
266/1629z	60°14.76	29°07.66	124	232.0°	0.4	683	13256.1	strong over 100m	sig -12db		dredge on deck
266/1702z	60°14.35	29°08.70	124	237.0°	0.8	755	13257.1	strong			sea too rough for dredging, waiting .....
266/1800z	60°13.68	29°10.84		246.0°	1.0	786	13249.7	weak- mod over 150m	sig -22db		
266/1835z	60°13.24	29°12.00		240.0°	0.8	891	13220.9	weak over 200m	sig -16db		
266/1900z	60°13.05	29°12.80		238.0°	0.9	925	13244.7				
266/2000z	60°14.03	29°11.49		044.3°	11.1	936	13214.9	moderate over 50m	sig -20db		turning to head towards wp125, to check sea state on deck
266/2106z	60°16.74	29°03.20		246.0°		841	13251.6				
266/2143z	60°16.36	29°04.83	125	267.0°	1.5	755		moderate over 50m	sig -14db		dredge deployed on station 125
266/2200z	60°16.30	29°05.38	125	278.0°	0.9	652	13257.2				
266/2206z	60°16.31	29°05.57	125	281.0°	0.4	655		weak over 150m	sig -29db		dredge on bottom wo768
266/2210z	60°16.35	29°05.66	125	260.0°	0.1	660		"	sig -30db		pinger off bottom wo887
226/2215z	60°16.32	29°05.72	125	261.0°	0.5	665		weak getting sharper over 150m			hauling in max wo887
266/2231z	60°16.22	29°06.01	125			686					dredge off bottom wo 678
266/2255z	60°16.19	29°06.25	125	254.0°	0.5	725		mod over 80m	sig -13db		dredge on deck
266/2300z	60°16.20	29°06.32		256.0°	0.8	729	13254.6				underway to wp126
267/0000z	60°17.49	29°08.97		090.0°	6.3	957	13246.6				change watch
267/0035z	60°16.53	28°58.83	126	252.0°		845					dredge deployed wp126
267/0100z	60°16.43	28°59.14	126	256.0°	0.2	833	13249.6	sharp	sig -20db		dredge on the bottom wo850
267/0110z	60°16.36	28°59.34	126	260.0°		821					hauling in
267/0126z	60°16.23		126	260.0°		840		mod	sig -27db		dredge off bottom wo860
267/0146z	60°17.96	28°59.78	126	256.9°	0.2	961					dredge on deck
267/0159z											
267/0232z	60°21.97	28°02.46	127			760	13207.5	v strong over 50m	sig -19db		on station, wp127
267/0236z	60°21.94	28°02.45	127			760					dredge deployed
267/0255z	60°21.86	29°02.756	127	260.0°	0.2	760	13255.8	sharp	sig -21db		Dredge on bottom Max WO 949
267/0304z	60°21.81	29°03.00	127	259.0°	0.6	759		Strong over 50m	"		Hauling in
267/0319z	60°21.82	29°03.45	127	259.0°	0.8	810	13256.0	Moderate			Dredge off bottom WO 815
267/0338z	60°21.88	29°04.01	127	264.1°		832					Dredge on deck
267/0503z	60°22.49	29°04.07			11.6	910	13215.4	Hummocky	sig -22db		U/W to station WP128
267/0537z	60°22.48	28°55.99	128	250.3°	0.6	782	13256.4	Mod over 150m	sig -24db		Dredge deployed
267/0555z	60°22.45	28°56.34	128	251.8°	0.1	725		Layered weak.strong	sig -23db		Dredge on bottom WO 806
267/0606z	60°22.48	28°56.43	128	254.0°	0.6	731	13255.1	"	sig -24db		Hauling in Max WO =941
267/0624z	60°22.45	28°56.80	128	255.0°	0.5	810		Fuzzy over 75m	"		Dredge off bottom WO 786
267/0644z	60°22.41	28°57.88	128	257.0°	0.6	828	13255.5	Strong	sig -21db		Dredge on deck

267/0728z	60°24.09	28°53.92	129	250.0°	0.7	803	13260.5	Moderate	sig -23db	Dredge deployed WP 129
267/0747z	60°24.13	28°54.16	129	232.0°	0.7	670		Strong	sig -30db	Dredge on bottom WO 772
267/0757z	60°24.12	28°54.38	129	263.0°	0.2	635		Sharp	sig -34db	Hauling in Max WO 661
267/0800z	60°24.10	28°54.42	129	256.0°	0.4	630	13258.6			
267/0816z	60°24.16	28°54.66	129	261.0°	0.5	656		Strong over 20m	sig -28db	Dredge off bottom WO 648
267/0827z	60°24.07	28°54.94	129	249.0°	0.4	798		Weak over 150m	sig -17db	Dredge on deck
267/0900z	60°23.86	28°56.02		252.0°	1.5	857	13259.6			
267/0848z	60°25.84	28°52.37	130	256.0°	0.3	780		Moderate over 100m		
267/1000z	60°25.84	28°52.44	130	262.0°	0.5	754	13253.6			
267/1016z	60°25.87	28°52.65	130	245.0°	0.3	744		mod over 80m	sig -13db	dredge deployed pinger on 200m
267/1040z	60°25.77	28°52.99	130	261.0°	0.3	727		strong over 80m	sig -24db	dredge on bottom wo748
267/1043z	60°25.81	28°52.95	130	263.0°		727		"	"	pinger 50m off bottom wo748
267/1048z	60°25.78	28°53.11	130	266.0°		729		strong over 80m	"	hauling in
267/1100z	60°25.81	28°53.31	130	266.0°	0.5	746	13256.1			
267/1101z	60°25.81	28°53.34	130	266.0°	0.3	748		strong over 70m		dredge off bottom wo762
267/1124z	60°25.82	28°53.71	130	252.0°	0.5	794		mod/strong over 50 m	sig -14db	dredge on deck, bag strangled
267/1200z	60°26.43	28°44.76		070.0°	11.3	867	13208.7			u/way to wp 131, change watch
267/1223z	60°27.76	28°42.36	131	270.0°	0.1	751				at wp 131, dredge deployed
267/1244z	60°27.76	28°42.76	131	267.0°	0.5	715	13267.1	mod	sig -24db	dredge on bottom wo740
267/1247z	60°27.74	28°42.78	131			700				50m from bottom wo930
267/1253z	60°27.76	28°42.86	131							hauling in wo930
267/1305z	60°27.74	28°43.13	131	268.8°	0.3	700		strong over 75m	sig -17db	off bottom wo750
267/1330z	60°27.76	28°43.82	131	258.8°	0.1	772	13261.4	"	"	dredge on deck, delay to change dredge
267/1439z	60°32.20	28°39.98	132	262.0°	1.0	620	13281.6	sharp over 50m	sig - 15db	dredge deployed wp132
267/1455z	60°32.12	28°39.35	132	264.0°	0.1	845		sharp over 75m	sig - 24db	dredge on bottom W/O 600
267/1504z	60°32.06	28°39.46	132	267.0°		552		sharp over 80m	sig - 26db	hauling in
267/1517z	60°32.01	28°39.60	132	252.0°	0.4	590	13277.6	moderate over 150m		dredge of bottom W/O 590m
267/1535z	60°31.86	28°39.67	132	227.2°	0.1	667				dredge on deck
267/1701z	60°35.92	28°36.14	133	274.0°		600	13286.2	strong over 50m	sig -8 db	dredge deployed wp133
267/1716z	60°35.95	28°36.24	133	274.0°		586		"	sig - 16db	dredge on bottom W/O 627m
267/1726z	60°35.95	28°36.52	133	278.0°	0.6	592	13285.2	"	sig -14db	hauling in W/O max 163
267/1800z	60° 36.04	28°37.36	133	272.0°	0.6	495		"	sig - 24db	dredge off bottom W/O 470
267/1814z	60°36.08	28°37.66	133	275.0°	0.5	612	13286.8	"	sig -21 db	dredge on deck
267/1900z	60°40.03	28°27.40		216.0°	7.8	666	13253.7			u/w to wp134
267/1925z	60°40.66	28°27.27	134	280.0°	0.4	595		fuzzy	sig -21db	dredge deployed
267/1937z	60°40.69	28°27.39	134	271.3°	0.7	608	13289.3	mod over 75m	sig -24db	dredge on bottom w/o 635 max 781
267/1958z	60°40.75	28°27.92	134	283.0°	0.4	668		mod/stong over 80m	sig -24db	dredge off bottom w/o 673
267/2000z	60°40.75	28°27.96	134	281.0°	0.2	675	13289.5			
267/2015z	60°40.83	28°26.21	134	284.0°	0.7	612		mod/weak over 150m	sig -21db	dredge on deck
267/2100z	60°42.97	28°23.47		018.8°	8.9	723	13252.9	strong-hummocky over 75m	sig -20db	
267/2115z	60°43.20	28°24.36	135	213.0°	0.2	808		mod over 60m	sig -21db	at wp135
267/2119z	60°43.17	28°24.37	135	279.0°		815		"	sig -23db	dredge deployed
267/2140z	60°43.22	28°24.66	135	278.0°		762		weak over 200m	sig -26db	dredge on bottom w/o 904
267/2142z	60°43.24	28°24.69	135	273.0°	0.3	749		"	sig -26db	pinger 50m off bottom w/o 1011
267/2147z	60°43.23	28°24.79	135	267.0°	0.4	700		"	sig -29db	hauling in
267/2200z	60°43.27	28°25.01	135	272.0°	0.1	650	13288.5			
267/2221z	60°43.36	28°25.44	135	269.0°		647		strong over 80m	sig -24db	dredge off bottom w/o 701
267/2237z	60°43.44	28°25.82	135	263.0°		677		mod/strong over 80m	sig -20db	dredge on deck -strangled
267/2300z	60°43.61	28°25.83		060.0°	11.2	684	13289.1			
268/0000z	60°49.92	28°14.17	136	270.0°	0.3	764	13294.4			on waypiont 136 watch change
268/0029	60°49.96	28°14.69	136	241.0°	0.4	805				dredge on bottom w/o860 max999
268/0039	60°49.90	28°14.65	136	228.0°		793				start hauling in
268/0054	60°49.84	28°14.55	136	246.0°		780				off bottom w/o 822
268/0118	60°49.89	28°14.87	136	260.6°	1.4	791				dredge on deck,underway to waypoint 137
268/0145	60°52.43	28°14.13	137	248.0°	0.4	827	13284.6	dark +fuzzy over 50m	sig -21db	at wp137 dredge deployed
268/0205	60°52.38	28°14.40	137			701		malfunction in 3.5 and SIMRAD ECHO VALUES		dredge on bottom w/o775
268/0209	60°52.37	28°14.44	137			701				pinger 50m off bottom
268/0218z	60°52.27	28°14.44	137	228.3°	0.6	700	13290.2	mod weak over 100m	sig -20db	
268/0226z	60°52.20	28°14.26	137			750				Dredge off bottom
268/0247z	60°52.07	28°14.79	137	203.7°	0.8	761	13293.1	mod over 80m	sig -13db	Dredge on deck
268/0345z	60°56.77	28°05.13	138	253.0°	0.8	756	13289.0	Strong over 30m	sig -15db	At WP 138. Dredge deployed
268/0410z	60°56.70	28°06.44	138	261.0°	0.6	691	13291.2	fuzzy over 100m	sig -24db	Dredges on bottom WO 165

268/0421z	60°56.73	28°05.64	138	241.0°	0.2	698		"	sig -26db	Hauling in max WO 905
268/0437z	60°56.61	28°05.81	138	240.0°		691		"	sig -25db	Dredge off bottom WO 706
268/0458z	60°56.48	28°05.36	138	241.0°		698	13290.7	strong	sig -10db	dredge on deck
268/0539z	61°00.11	28°02.63	139	245.0°		896		Weak	sig -16db	Dredge deployed WP 139
268/0605z	61°00.10	28°02.82	139	251.0°	0.8	870	13290.9	Moderate over 50m	sig -20db	Dredge on bottom WO 939
268/0613z	61°00.08	28°03.50	139	200.0°	0.1	870		"	sig -16db	hauling in max w/o 1087
268/0628z	61°00.16	28°03.22	139	245.0°	0.8	871		sharp	sig -20 db	dredge of bottom w/o 875
268/0658z	60°59.75	28°03.55	139	249.0°	0.3	902	13781.3	fuzzy	sig -27db	dredge on deck
268/0752z	61°01.52	27°56.90	140	255.0°		625	13308.5	weak to moderate	sig -27 db	dredge deployed at wp 140
268/0800z	61°01.53	27°56.96	140	242.0°	0.1	567	13305.5			
268/0807z	61°01.49	27°57.07	140	239.0°	0.5	562		weak over 200m	sig -27db	dredge on bottom w/o 677
268/0810z	61°01.49	27°57.13	140	239.0°	0.5	561		weak over 200m	sig -29db	w/o 762
268/0815z	61°01.46	27°57.27	140	240.0°	0.4	546		"	sig -29db	hauling in
268/0835z	61°01.40	27°57.63	140	232.0°	0.4	611		weak over 150m	sig -24db	dredge off bottom w/o 606
268/0851z	61°01.34	27°57.90	140	246.0°	0.1	766		mod/strong over 75m	sig -20db	dredge on deck-strangled
268/0900z	61°01.29	27°58.28		240.0°	1.0	733	13304.5			
268/1000z	61°06.28	27°52.35		233.0°	0.9	815	13323.8			
268/1100z	61°05.43	27°50.54		251.0°	2.5	613	13307.4			
268/1103z	61°05.37	27°50.88	141	242.0°	0.4	607				at wp 141
268/1109z	61°05.35	27°50.94	141	238.0°		606		sharp return strong over 30m	sig -17db	dredge deployed
268/1130z	61°05.30	27°51.40	141	238.0°		590		sharp rtn,strong over 50m	sig -21db	dredge on bottom
268/1136z	61°05.31	27°51.47	141	241.0°		554		"	sig -24db	pinger 50m of bottom w/o 763
268/1141z	61°05.32	27°51.55	141	237.0°	0.3	599		"	sig -22db	hauling in -biting immediately
268/1152z	61°05.29	27°51.91	141	240.0°		620		sharp rtn strong over 75m	sig -27db	dredge off bottom w/o 641
268/1200z	61°05.26	27°52.07	141	241.0°		690	13310.3			
268/1210z	61°05.23	27°52.39	141	240.0°		863				dredge on deck
268/1212z	61°05.25	27°52.48		325.0°	5.0					u/w to wp 142
268/1256z	61°11.00	27°42.56		050.0°	11.0	510				through wp142 (to get simrad)
268/1259z	61°11.41	27°41.99								turning back to wp142
268/1308z	61°11.41	27°42.99		230.0°		510				stopping at wp142 to deploy
268/1312z	61°11.12	27°42.18		203.0°		530	13322.0	Spread over ca 20m	sig -24db	At EP 142. Dredge deployed
268/1325z	61°11.10	27°42.06	142	219.0°		540		"	"	Dredge on bottom WO 570m
268/1334z	61°11.11	27°42.12	142	210.0°		540		"	"	Hauling in
268/1353z	61°11.07	27°42.26	142	217.0°	0.5	502		Spread over 75m	"	Dredge off bottom WO 527
268/1400z	61°11.05	27°42.34	142	216.0°	0.6	490				
268/1407z	61°11.08	27°42.40	142	216.0°		510				Dredge on deck
268/1440z	61°10.54	27°42.87	142a			720	13317.0			Over WP 142a. Turning round to commence station
268/1447z	61°10.49	27°42.62	142a	350.0°	0.5	750		Strong over 30m	sig -22db	Dredge deployed
268/1505z	61°10.66	27°42.47	142a	210.0°	1.0	600		Moderate over 75m	sig -25db	Winch restarted at WO 305
268/1514z	61°10.54	27°42.53	142a	187.0°		750		Spread over 30m	sig -18db	WO 760
268/1528z	61°10.82	27°42.44	142a	343.0°	0.7	530		spread over 30m	sig -20db	paying out to 806
268/1532z	61°10.96	27°42.35	142a	344.0°	0.4	510				few nibblee:hauling in
268/1535z			142a							bite to 5 ton
268/1545z	61°11.28	27°42.15	142a	351.0°	0.7	600		dipping steeply	sig -23db	dredge off bottom w/o 705
268/1601z	61°11.80	27°41.63	142a	041.0°	0.2	764				dredge on deck
268/1630z										start steaming to next wp
268/1700z	61°14.34	27°35.65		047.0°	11.6	715	13288.6			on route to wp145
268/1723z	61°16.43	27°35.85	143	050.5°	5.2	625				at wp 145
268/1742z	61°16.06	27°35.10	143	212.6°	0.1	612	13324.6	mod over 60m	sig -18db	dredge deployed
268/1800z	61°16.01	27°35.16	143			595	13325.2	mod over 300m	sig -24db	dredge on bottom w/o 630 max 770
268/1810z	61°15.97	27°35.25	143	220.6°		575				hauling in-ship stopping to haul dredge in to stop it being lost on upslope w/o 625
268/1825z	61°15.94	27°35.24	143	217.4°	0.4	586	13324.4	mod over 200m	sig -19db	dredge off bottom
268/1847z	61°15.75	27°35.37	143			549				dredge on deck
268/1904z	61°15.53	27°35.97		221.9°	1.7	515	13328.1	depth is rising slowly		changing dredge bag
268/1912z	61°15.37	27°36.00		225.8°	1.6	552				starting to steam to next wp whilst fixing bag
268/1927z	61°16.70	27°34.97								1 mile from wp-doing survey
268/1940z	61°17.54	27°36.29	144							survey over wp
268/1943z	61°17.61	27°36.47								turning to go on station
268/1950z	61°17.70	27°36.06	144	202.4°	1.0	583	13318.3	mod over 70m	sig -15db	on station-wp144
268/1957z	61°17.64	27°36.00	144	223.1°		566	13326.2	mod over 100m	sig -17db	dredge deployed
268/2000z	61°17.64	27°35.97	144	220.0°		578	13326.9			
268/2015z	61°17.52	27°25.98	144			534		strong over 150m	sig -26db	dredge on bottom w/o 610

268/2019z	61°17.53	27°36.02	144			526		"	"	pinger 50m off bottom w/o 759
268/2024z	61°17.51	27°36.10	144	212.0°	0.5	518		"	sig -22db	hauling in
268/2040z	61°17.41	27°36.02	144	202.0°		549		mod/strong over 150m	sig -23db	dredge off bottom w/o 555
268/2058z	61°17.22	27°35.93	144	211.0°	0.1	636		strong over 60m	sig -20db	dredge on deck
268/2100z	61°17.23	27°35.95		210.0°		633	13325.8			
268/2200z	61°20.63	27°27.09		041.0°	8.2	715				start of survey over wp
268/2201	61°20.75	27°26.93		040.0°	7.0	675	13292.9			
268/2228z	61°22.98	27°23.43		114.0°	4.7	671				starting turn back to new wp 145
268/2256z	61°20.79	27°26.02	145	184.0°	0.1	532				at wp 145 (new one)
268/2300z	61°20.75	27°62.02	145	186.0°	0.5	520	13325.0			
268/2306z	61°20.71	27°26.08	145	183.0°		495		strong over 80m	sig -19db	dredge deployed
268/2322z	61°21.62	27°26.04	145	184.0°	0.4	482		"	sig -23db	dredge on bottom w/o 532
268/2325z	61°20.57	27°26.03	145	189.0°	0.1	489		"	sig -20db	pinger 50m off bottom w/o 663
268/2330z	61°20.52	27°26.11	145	191.0°	0.1	504		"	sig -18db	wire payed out down slope-hauling in w/o 690
268/2341z	61°20.42	27°26.08	145	180.0°	0.1	559		sharp strong over 50m	sig -27db	dredge off bottom w/o 549
268/2358z	61°20.27	27°25.95	145	185.0°		734		mod over 150m layered	sig -19db	dredge on deck
269/0000z	61°20.27	27°25.97	145	208.0°	0.4	745	13321.3			change watch
269/0027z	61°19.51	27°26.17		008.0°	9.0					U/way to WP 146
269/0056z	61°24.40	27°24.49	146	005.0°	8.0	620	13326.0			through WP 146(surveying)
269/0110z	61°24.55	27°24.68	146	165.0°	0.6	665		sharp over 30m		on station at WP 146, dredge deployed
269/0131z	61°24.46	27°24.70	146	174.0°	0.4	665		"	sig=-20dB	dredge on bottom, w/o=690 max=848
269/0141z	61°24.38	27°24.74	146	174.0°	0.4	665		"		hauling in
269/0159z	61°24.24	27°24.85	146	174.0°	0.4	690	13330.3	"	sig=-23dB	dredge off bottom, w/o=703
269/0220z	61°24.08	27°24.82	146	174.0°	0.4	705				dredge off deck
269/0230z	61°23.95	27°24.86		060.0°	5.0					u/way to WP 147
269/0303z	61°27.79	27°15.30	147	053.0°	8.5	640	13308.4	strong over 30m	sig=-20dB	through WP 147(surveying)
269/0309z										turning round-back to WP 147
269/0320z	61°27.79	27°15.61	147	162.0°	0.1	620		mod over 50m	sig=-28dB	At WP 147, dredge deployed
269/0340z	61°27.85	27°15.33	147	182.0°	0.8	640		strong over 30m	sig=-25dB	dredge on bottom, w/o 693 max 814
269/0349z	61°27.77	27°15.47	147	182.0°	0.8	600		spread 600-640		hauling in
269/0400z	61°27.67	27°15.31	147	161.0°	0.4	590				bites to 5 tonnes
269/0408z	61°27.61	27°15.02	147	160.0°	0.4	694		strong	sig=-30dB	dredge off bottom w/o 666
269/0428z	61°27.50	27°14.32	147	154.0°	0.3	733	13227.9	"	sig=-22dB	dredge on deck
269/0523z	61°30.99	27°13.33	A'	032.0°	9.3	919	13340.5	"	sig=-17dB	starting first line of SIMRAD survey, A'=start point
269/0550z	61°34.79	27°07.44	A	036.0°	9.7	821	13311.9			At WP A
269/0620z	61°33.77	27°04.48	B	209.0°	6.3	687	13341.2	hummocky	sig=-27dB	At WP B
269/0800z	61°25.15	27°17.39		212.0°	6.5	767	13346.5			change watch
269/0817z	61°23.57	27°19.78	C	212.0°	6.3	776	13345.3	sharp & hummocky		At WP C
269/0900z	61°25.16	27°28.01		336.0°	10.3	875	13357.2			
269/0908z	61°25.66	27°26.65	D	046.8°	9.0	862		sharp, strong & hummocky	sig=-13dB	At WP D
269/1000z	61°32.96	27°15.55		033.0°	10.0	907	13308.9			
269/1019z	61°35.92	27°11.10	E	036.0°	10.0	865		strong hummocky	sig=-15dB	At WP E, c/c to return to WP 146
269/1100z	61°35.84	27°12.42		180.0°	4.9	795	13342.1	"	sig=-11dB	
269/1200z	61°33.40	27°13.90		192.0°	0.8	1026	13306.3			change watch
269/1300z	61°31.28	27°14.67		180.9°	2.9	730	13330.5	strong to mod over 70m	sig=-15dB	
269/1331z	61°30.70	27°15.20		182.4°	3.1	684		strong over 50m	sig=-19dB	c/c to WP F
269/1340z	61°34.00	27°18.00	F	044.0°	7.8	870				At WP F, a/c towards G
269/1400z	61°49.73	27°26.70		037.0°	8.4	822	13319.0	sharp, strong refins over 20m	sig=-17dB	
269/1410z	61°46.56	27°13.56	G	010.3°	10.2	750				At WP G, hdg to WP H
269/1424z	61°37.46	27°09.32	H			812				At WP H, hdg to WP I
269/1456z	61°41.16	27°02.24	I			719				At WP I, hdg to WP J
269/1500z	61°40.95	27°01.20		127.6°	7.5	726	13325.3	mod over 25m	sig=-15dB	hdg to WP J
269/1600z	61°36.95	27°55.02		201.0°	5.1	847	13350.6			
269/1630z	61°33.91	26°57.36		196.0°	6.1	787	13349.4			
269/1700z	61°31.57	26°59.40		200.0°	5.8	806	13346.3			
269/1730z	61°28.90	27°01.97		201.0°	5.8	925	13337.5			
269/1800z	61°26.46	27°04.11		206.0°	4.9	910				
269/1830z	61°24.02	27°06.39		209.8°	5.1	994				
269/1900z	61°22.02	27°08.30		216.0°	4.8	950				
269/1909z	61°21.22	27°09.13	K	223.0°	5.0	959	13329.2			Turning at WP K
269/1930z	61°22.13	27°13.65		279.0°	7.1	697	13353.8			
269/2000z	61°23.08	27°18.96		242.0°	2.6	849	13346.9			change watch

269/2100z	61°21.89	27°24.00		244.0°	2.8	953	13334.0	slightly rippled witha flat underside	sig=-20dB		
269/2200z	61°20.75	27°28.41		275.0°	0.1	860	13327.7	Hyperbolic, strong	sig -14Db	Hove to, storm	
269/2300z	61°19.51	27°29.70		270.0°	1.1	890	13324.2	"	"		
270/0000z	61°17.51	27°32.79		230.0°	2.0			"	"		
270/0030z	61°16.99	27°33.08		231.0°	1.8	811	13323.2	Hummocky	sig -17db		
270/0100z	61°16.18	27°34.20		229.0°	1.7	675	13323.2	"	"		
270/0130z	61°15.32	27°35.11		226.0°	1.7	692	13325.0	"	sig -18db		
270/0200z	61°14.35	27°36.40		229.0°	2.1	644	13325.8	"	sig -12db		
270/0230z	61°13.52	27°37.65		230.0°	2.9	764	13327.8	"	sig -17db		
270/0300z	61°12.48	27°39.06		218.0°	1.6	661	13329.1	Quite hummocky	sig -20db		
270/0330z	61°11.63	27°40.26		230.0°	2.2	694	13322.8	Strong over 50m	sig -12db		
270/0400z	61°10.76	27°62.01		236.4°	2.1	590	13324.3	Weak to mod over 100m	sig -23db		
270/0430z	61°10.02	27°43.99		232.9°	2.4	744	13319.4	hummocky mod over 50m	sig -13db		
270/0500z	61°09.39	27°45.5		230.3°	1.7	833	13312.8	"	sig -14db		
270/0539z	61°08.40	27°48.01		229.6°	2.1	705	13319.7	"	sig-15db		
270/0600z	61°07.83	27°49.35		234.0°	2.4	823					
270/0630z	61°07.10	27°50.98		234.0°	2.8	588	13315.1				
270/0700z	61°06.62	27°52.46		238.0°	2.6	702	13315.0				
270/0730z	61°05.90	27°55.27		241.0°	1.9	823	13313.0				
270/0800z	61°05.43	27°56.78		240.0°	2.7	878	13312.5	Weak to moderate pver 75m	sig -6db		
270/0831z	61°04.83	27°58.70		238.0°	2.5	975	13309.4	"	sig -24db		
270/0900z	61°04.66	28°00.26		031.0°	10.7	813	13309.5	weak/mod over 75m	sig -18dB		
270/1000z	61°13.72	27°46.10		029.1°	11.2	907	13288.5	" hummocky	sig -20dB		
270/1100z	61°22.27	27°30.74		039.0°	11.2	981	13293.6	sharp,strong,hummocky	sig -12dB		
270/1200z	61°30.03	27°12.87		043.3°	8.1	854	13305.3	"	sig -10dB		
270/1221z	61°30.92	27°14.10		258.0°	3.5	709	13342.3	sharp over 50m	sig -7dB	a/c head to wind,to assee conditions	
270/1227z	61°30.90	27°14.46		230.0°	0.4	700	13345.0			at WP148	
270/1237z	61°30.74	27°14.63		260.0°	1.0	703		mod over 40m	sig -17dB	dredge deployed	
270/1258z	61°30.79	27°14.94		264.0°	0.3	735	13336.5	strong over 20m	sig -17dB	dredge on bottom wo 750m	
270/1306z	61°30.83	27°15.09		245.0°	0.7	750		strong over 20m	sig -20dB	hauling in	
270/1321z	61°30.71	27°15.37		244.0°	0.6	710		mod over 100m	sig -22dB	dredge on bottom	
270/1338z	61°30.56	27°15.82		232.0°	0.2	740		strong over 50m	sig -20dB	dredge on deck	
270/1400z	61°30.11	27°14.70		103.0°	10.0					u/w to WP149	
270/1415z	61°29.57	27°10.48		260.0°	0.9	660		strong over 20m	sig -21dB	at WP149	
270/1423z	61°29.56	27°10.67		256.0°		670		"		dredge deployed	
270/1439z	61°29.57	27°10.83		262.0°		650	13333.0	"	sig -22dB	dredge on bottom wo 681m	
270/1449z	61°29.57	27°10.97		256.0°		651		strong over 30m	sig -22dB	hauling in	
270/1500z	61°29.58	27°11.37		263.0°	0.5	740	13322.3	mod over 30m steeply dipping		dredge off bottom	
270/1518z	61°29.50	27°12.15		222.0°	0.5	821		strong over 20m	sig -20dB	dredge on deck	
270/1526z	61°29.47	27°12.13		023.0°	10.0					u/way to WP150	
270/1600z	61°35.19	27°06.70		029.0°	11.4	789	13316.7				
270/1614z	61°36.09	27°05.80	150	263.1°	0.2	653	13337.4	hummocky/mod-weak over 100m		dredge deployed	
270/1632z	61°35.96	27°06.26		266.3°	0.3	610		mod over 50m	sig -24dB	dredge on bottom wo 660m	
270/1653z	61°36.01	27°06.65				625				dredge off bottom wo 650m	
270/1714z	61°35.97	27°07.21		273.4°	0.6	744	13343.3	mod over 150m	sig -16dB	dredge on deck	
270/1800z	61°40.00	27°00.96	151	285.3°	2.1	675	13341.7			on stn WP151	
270/1805z	61°39.09	27°01.13		292.8°	0.6	667	13353.8	hummocky over 50m	sig -15dB	dredge deployed	
270/1824z	61°40.09	27°01.50				673		mod over 90m	sig -22dB	dredge on bottom wo 680m	
270/1846z	61°40.12	27°02.13		280.8°	0.5	685		"	sig -25dB	dredge off bottom wo 726m	
270/1900z	61°40.12	27°02.46		278.0°	0.3	736	13351.6				
270/1909z	61°40.14	27°02.81		280.0°	0.4	836				dredge on deck	
270/1940z	61°45.54	26°57.94	152	302.8°	0.6	739	13349.7	hummocky over 100m	sig -16dB	dredge deployed	
270/2000z	61°42.58	26°58.26		275.0°	0.3	694	13353.4				
270/2003z	61°42.59	26°58.38		306.0°	0.1	712		mod/werak over 150m	sig -24dB	dredge on bottom wo 730m	
270/2013z	61°42.62	26°58.58		300.0°		730		"	sig -27dB	hauling in max wo 895m	
270/2023z	61°42.73	26°58.70		302.0°		708		mod/weak over 150m	sig -16dB	dredge off bottom wo 782m	
270/2047z	61°42.96	26°59.15		291.0°	0.7	675		"	"	dredge on deck	
270/2100z	61°43.21	26°59.83		320.0°	1.6	845	13356.6				
270/2136z	61°43.71	26°53.69	153	294.0°	0.1	632		sharp/strong hummocky	"	at WP153	
270/2138z	61°43.73	26°53.60		280.0°		618		"	sig -18dB	dredge deployed	
270/2156z	61°43.77	26°53.87		289.0°	0.2	567		mod over 80m	sig -21dB	dredge on bottom wo 600m	
270/2200z	61°43.76	26°54.11		295.0°	0.1	567	13353.9	"	sig -32dB		

270/2205z	61°43.80	26°54.19		297.0°	0.3	580		"	sig -28dB	hauling in
270/2217z	61°43.85	26°54.37		293.0°		602		"	sig -17dB	dredge off bottom wo 594m
270/2236z	61°43.99	26°54.78		298.0°		751		"	sig -17dB	dredge on deck
270/2300z	61°44.10	26°55.36		296.0°	0.8	911		mod/strong over 50m		
270/2338z	61°45.23	26°21.50	154	297.0°	0.4	764		sharp/strong over 30m	sig -20dB	at WP154- dredge deployed
271/0000z	61°46.16	26°51.55		326.4°		760	13353.1	strong over 50m		on bottom wo 780m
271/0013z	61°46.30	26°51.53		335.0°	0.6	737				hauling in
271/0030z	61°46.49	26°51.59		333.0°	0.3	767	13352.0	spread over 30m	sig -23dB	dredge on bottom wo 761m
271/0048z	61°46.74	26°51.56		331.0°	0.4	782				dredge on deck
271/0100z	61°47.15	26°51.68		104.0°	10.0	862	13354.2			u/way to WP155
271/0124z	61°46.70	26°46.27	155	315.0°	0.5	585	13354.8	mod over 40m	sig -25dB	at WP 155- dredge deployed
271/0142z	61°46.72	26°46.39		301.0°		555	13353.5	ranging over 70m	sig -24dB	dredge on bottom wo 633m
271/0145z	61°46.75	26°46.45		318.0°	0.5	565		"	"	incr. speed to 0.5kt across ground
271/0151z	61°46.84	26°46.61		316.0°	0.8	563		"	"	hauling in wo 740m
271/0206z	61°46.99	26°46.71		317.0°		650		spread over 40m	sig -53dBl	Dredge off bottom wo 621m
271/0222z	61°47.18	26°46.85		347.0°	0.2	774	13351.4	spread over 50m	sig -24dB	dredge on deck
271/0229z	61°47.82	26°46.53		029.0°	9.5	779				u/way to WP156
271/0249z	61°50.46	26°42.86	156	284.0°	1.1	500	13350.5	spread over 30m	sig -21dB	dredge deployed
271/0306z	61°50.45	26°43.28		285.0°		551		spread over 70m	sig -23dB	dredge on bottom wo 570m
271/0315z	61°50.56	26°43.35		286.0°	0.3	540				hauling in
271/0332z	61°50.53	26°43.73		290.0°	1.0	541	13361.9	spread over 30m	sig -23dB	dredge off bottom wo 555m
271/0346z	61°50.57	26°44.35		303.0°	0.1	487	13359.4	steeply dipping	sig -60dB	dredge on deck
271/0400z	61°50.74	26°43.97		097.0°	8.0	597	13354.1	rapidly rising	sig -26dB	u/way to WP 157
271/0428z	61°50.54	26°38.51	157	293.0°	0.1	637	13361.1	strong over 50m	sig -24db	Dredge deployed WP 157
271/0445z	61°50.51	26°38.52	157	292.0°		636		"	"	Dredge on bottom WO 682
271/0453z	61°50.56	26°38.75	157	324.0°	0.5	641	13358.1	"	sig -19db	Hauling in Max WO 816
271/0511z	61°50.79	26°38.98	157	325.0°	0.3	663		"	sig -18db	Dredge off bottom
271/0528z	61°50.93	26°39.23	157	322.0°	0.6	690	13358.0	strong over 75m	sig -23db	Dredge on deck
271/0558z	61°52.78	26°40.93	158	323.0°	0.2	657		Hummocky	sig -19db	Dredge deployted WP 158
271/0614z	61°52.92	26°41.06	158	308.0°		639	13361.0	Strong	sig -17db	Dredge on bottom WO 663
271/0622z	61°52.91	26°41.10	158	277.0°	0.2	635		"	sig -20db	Hauling in Max WO 809
271/0642z	61°53.04	26°41.71	158	285.0°	0.3	672	13359.7	"	sig -29db	Dredge off bottom WO, 664
271/0659z	61°53.09	26°41.96	158	276.0°		707		Moderate	sig -21db	Dredge on deck
271/0733z	61°53.94	26°35.28	159	309.0°	0.1	611	13361.0	Strong over 75m	sig -25db	Dredge deployed WP 159
271/0748z	61°54.06	26°35.49	159	251.0°	0.7	593		"	sig -24db	Dredge on bottom WO 651
271/0757z	61°54.00	26°35.75	159	300.0°	0.1	611	13364.9	Strong over 100m	sig -29db	Hauling in Max WO 804
271/0816z	61°54.16	26°36.03	159	292.0°		672		mod over 80m	sig -18db	dredge on bottom
271/0837z	61°54.35	26°36.42	159	288.0°	1.2	703		"	sig -19db	dredge on deck
271/0900z	61°54.87	26°34.83		055.0°	9.5	750	13359.0			
271/0922z	61°55.72	26°34.83	160	235.0°		679		mod over 50m	sig -15db	at wp 160
271/0945z	61°55.72	26°34.86	160	257.0°	0.1	698		mod over 80m	sig -19db	deploying dredge
271/1006z	61°55.63	26°35.02	160	240.0°		656		fuzzy over 150m	sig -23db	dredgr on bottom w/o 710
271/1009z	61°55.67	26°35.08	160	247.6°	0.3	656		"	sig -24db	pinger 50m off bottom WO 840
271/1014z	61°55.60	26°35.15	160	228.4°	0.5	604		fuzzy diffuse over 250m	sig -26db	hauling in WO 840
271/1029z	61°55.58	26°35.17	160	247.5°		610		fuzzy over 100m		dredge off bottom WO 677
271/1053z	61°55.55	26°35.61	160	252.0°	0.2	609		moderate over 90m	sig -20db	dredge on deck
271/1100z	61°55.54	26°35.77		244.0°	0.9	609	13366.7			
271/1139z	61°57.95	26°33.59	161	249.0°	0.5	645				At WP 161
271/1143z	61°57.91	26°33.64	161	255.0°	0.1	648		mod strong over 50m	sig -13db	Dredge deployed
271/1200z	61°57.90	26°33.74	161	242.0°	0.9	618				
271/1203z	61°57.87	26°33.85	161	252.0°	0.9	550	13369.3	mod over 150m	sig -26db	Dredge on bottom , WO 670 Max 816
271/1213z	61°57.85	26°34.27	161	250.0°	0.9	580		mod over 30m	"	Hauling in
271/1222z	61°57.84	26°34.61	161	251.0°	0.8	690		weak over 120m	sig -19db	Dredge off bottom WO 690
271/1244z	61°57.78	26°35.52	161	243.3°	1.9	760				Dredge on deck
271/1300z	61°58.33	26°32.70		059.0°	11.6	676	13338.3	rising steeply		UW to 162
271/1320z	62°00.16	26°26.46	162	239.0°	1.9	650	13361.7	weak over 130m	sig -25db	At WP 161 Dredge deployed.
271/1344z	62°00.06	26°26.79	162	260.0°	1.0	624		mod over 50m	sig -20db	dredge on bottom WO 664 MAx 870
271/1354z	62°00.09	26°27.04	162	257.0°	0.6	644		mod over 50m	sig -24db	Hauling in
271/1400z	62°00.11	26°27.31	162	260.0°	0.5	727		steeply dipping		dredge off bottom WO 745
271/1443z	62°00.35	26°24.43	163	233.0°	1.1	573	13353.1	strongly over 35m	sig -15db	at WP 163 Dredeg deployed
271/1503z	62°00.35	26°24.49	163	252.0°	0.4	540	13374.0	strong over 20m	sig -22db	Dredegh on bottom, WO 560. Max 712
271/1515z	62°00.41	26°24.72	163	272.0°	0.6	556		"	"	Hauling in

271/1523z	62°00.48	26°24.93	163	270.0°	0.6	617	13373.9	spread over 40m	sig-33	Dredge off bottom
271/1543z	62°00.63	26°25.42	163	274.9°		771				Dredge on deck
271/1600z	62°01.70	26°26.82								Not UW to next WP. Problem with A frame
271/1625z	62°01.66	26°26.87	164	259.6°		543	13376.4	mod over 70m	sig -18db	Dredge deployed WP 164
271/1640z	62°01.61	26°26.90	164	254.0°		530	13375.3	":	sig -26db	On bottom WO 572Max 714
271/1646z	62°01.65	26°27.04	164	249.0°	0.6	529		moderate over 50m	sig -23db	Hauling in
271/1704z	62°01.57	26°27.22	164	246.0°	0.3	564	13375.3	"	sig -22db	Dredge off bottom WO 560
271/1721z	62°01.49	26°27.44	164	260.0°	0.5	625		strong over 50m	sig -18db	Dredge on deck
271/1801z	62°04.35	26°20.86	165	248.0°		600		moderate over 75m	sig -25db	Dredge deployed
271/1817z	62°04.29	26°21.18	165	252.0°	0.2	589		"	sig -20db	dredge on bottom WO 610
271/1825z	62°04.21	26°21.18	165	252.0°	0.2	587	13380.1	moderate to strong over 75m	sig -13db	hauling in Max 764
271/1841z	62°04.20	26°21.42	165	252.0°		600	13380.6	mod strong over 75m	sig -25db	dredge off bottom w/o 610m
271/1855z	62°04.13	26°21.74	165	250.0°	0.1	614		"	sig -19db	dredge on deck
271/1934z	62°08.04	26°18.03	166	248.0°	0.3	520	13392.2	moderate	sig -13db	dredge deployed
271/1948z	62°08.02	26°18.15	166	275.0°	0.3	492		fuzzy strong	sig -7db	dregde on bottom w/o 545
271/1957z	62°08.05	26°18.39	166	271.0°	0.3	475	13388.9	"	sig -6db	hauling in max w/o 688
271/2000z	62°08.08	26°18.43	166	271.0°	0.4	474	13388.4			
271/2018z	62°08.13	26°18.74	166	269.0°	0.3	513		strong over 10m	sig -15db	dredge off boyyom w/o 528
271/2031z	62°08.18	26°19.10	166	269.0°	0.4	520		strong over 30m		dredge on deck
271/2052z										return to 62°08.05 /26°18.39 to deploy CTD
271/2100z	62°08.21	26°19.66				585	13387.5	strong over 30m		
271/2200z	62°08.42	26°17.99	CTD2	168.0°	2.5	647	13356.2	strong over 40m hummockey	sig -13db	
271/2215z	62°08.05	26°18.31	CTD2	245.9°		474		plateau, double reflection over 50m	sig -13db	on site for CTD2
271/2222z	62°08.06	26°18.31	CTD2	247.6°		474		"	"	CTD deployed
271/2300z	62°07.98	26°18.36	CTD2	265.1°		485	13386.9	strong 3 layers over 80m	sig -15db	
271/2309z	62°07.80	26°18.35	CTD2	268.0°	0.3	473		"	sig -10db	CTD on deck
271/2317z	62°08.03	26°18.48								fuzz on bottom on 3.5 record
272/0000z	62°09.01	26°10.04		225.8°	3.5	580	13382.8	hummocky strong over 75m	sig -18db	
272/0007z	62°08.90	26°10.60	167	261.0°	1.8	573	13396.3	moderate over 40m		at wp 167 dredge deployed
272/0026z	62°08.88	26°11.03	167	289.0°		570		moderate over 50m	sig -22db	dredge on bottom w/o 585 max 731
272/0034z	62°08.84	26°11.07	167	276.0°	0.6	543		strong/mod over 50m	sig -24db	hauling in
272/0048z	62°08.78	26°11.52	167	274.0°	0.9	597	13387.9	mod over 30m		dredge off bottom w/o 594
272/0107z	62°08.68	26°12.09	167	277.6°	0.6	677				dregde on deck,u/w to wp168
272/0141z	62°12.01	26°07.58	168	288.0°	2.3	450				slowing down for wp 168
272/0152z	62°11.91	26°07.69	168	280.0°	0.6	397				dredge deployed
272/0200z	62°11.91	26°07.81	168	299.0°	0.5	399	13400.9	strong over 30m		dredge on bottom w/o 420
272/0206z	62°11.95	26°07.99	168	296.0°				"	"	pinger 50m off w/o 599
272/0212z	62°11.98	26°08.09	168	302.0°	0.2	450				hauling in w/o 599
272/0225z	62°12.03	26°08.33	168	300.8°	0.5	470				dredge off bottom w/o 478
272/0239z	62°12.22	26°08.71	168	303.4°	0.8	437				dredge on deck u/w to wp 169
272/0253z	62°13.77	26°07.26		021.0°	11.2	479				u/w to wp 169
272/0301z	62°14.51	26°06.78	169	232.0°	0.6	374	13397.3			at wp 169
272/0321z	62°14.44	26°06.96	169	287.0°	0.2	405		strong over 50m	sig -22db	dredge on bottom w/o 435 max 595
272/0332z	62°14.48	26°07.16	169	292.0°	0.6	405				hauling in
272/0340z	62°14.59	26°07.43	169	286.0°	0.6	490	13402.3	strong over 50m		dredge off bottom w/o 490
272/0358z	62°14.69	26°07.77	169	282.8°	0.3	540				dredge on deck u/w to 170
272/0426z	62°17.03	26°05.66	170	282.0°	0.1	617	13397.6	spread over 100m	sig -23db	dredge deployed
272/0446z	62°16.99	26°05.72	170	283.0°		624		"	sig -25db	dredge on bottom w/o 675
272/0456z	62°16.97	26°05.84	170	280.0°	0.5	619	13395.3	"	"	hauling in max 820
272/0512z	62°17.04	26°06.14	170	289.0°	0.5	647		"	sig -22db	dredge off bottom w/o 635
272/0533z	62°17.08	26°06.30	170	272.0°		622	13397.7	weak and layered	sig -26db	dredge on deck
272/0618z	62°16.09	25°55.08	171	281.0°	0.1	703		moderate over 50m	sig -17db	dredge deployed WP 171
272/0639z	62°16.11	25°55.20	171	282.0°	0.6	636	13390.6	weak	sig -23db	dredge on bottom 724
272/0661z	62°16.09	25°55.47	171	281.0°	0.2	724		"	sig -21db	hauling in max WO 801
272/0707z	62°16.05	25°55.63	171	276.0°	0.4	747	13390.1	"	sig -25db	dredge off bottom WO 734
272/0729z	62°17.99	25°55.90	171	274.0°		812		"	sig -24db	dredge on deck
272/0800z	62°21.41	25°52.75		347.0°	5.5	445	13382.6	hummocky moderate over 50m	sig -25db	
272/0810z	62°21.84	25°52.93	172	330.0°		533		moderate over 75m	sig -21db	on station WP 172
272/0815z	62°21.86	25°59.91	172	330.0°		536		"	sig -18db	dredge deployed
272/0829z	62°21.95	25°52.93	172	320.0°		539		"	sig -22db	dredge on bottom WO 650
272/0837z	62°22.01	25°52.94	172	319.0°	0.3	511		moderate to weak over 120m	sig -24db	hauling in Max WO 721
272/0852z	62°22.09	25°53.05	172	318.0°	0.5	507		strong to moderate over 110m	sig -22db	dredge off bottom WO 580

272/0900z	62°22.19	25°53.08	172	323.0°		517	13403.1	moderate over 75m	sig -24db	
272/0907z	62°22.22	25°53.16	172	322.0°	1.1	514		mod strong over 80m	sig -23db	dredge on deck
272/1000z	62°24.06	25°51.15	173	321.0°	0.7	594	13400.3	mounds, mod weak over 95m	sig -26db	on station WP 173
272/1004z	62°24.10	25°51.17	173	348.0°	0.4	574		mod over 60m faintly layered	sig -28db	dredge deployed
272/1017z	62°24.16	25°51.09	173	306.0°		572		moderate over 40m		dredge on bottom
272/1020z	62°24.17	25°51.10	173	307.0°	0.4	521				pinger 50m off bottom WO 700
272/1026z	62°24.22	25°51.13	173					mod over 45m	sig -23db	hauling in
272/1042z	62°24.26	25°51.27	173	304.0°	0.3	514		"	sig -24db	dredge off bottom WO 555
272/1058z	62°24.36	25°51.38	173	303.0°	0.2	494		"	sig -23db	dredge on deck
272/1100z	62°24.41	25°51.42	173	304.0°	0.5	495	13401.4	"	sig -22db	
272/1147z	62°26.17	25°42.47	174	217.0°	0.8	629		hummocky over 95m	"	on station WP 174
272/1150z	62°26.11	25°42.47	174	230.0°	0.2	631		"	"	dredge deployed
272/1200z	62°26.08	25°42.60	174	268.0°		593	13402.7	plateau mod strong at 30m	sig -18db	
272/1207z	62°26.05	25°42.73	174	267.0°		577		strong over 30m	sig -27db	dredge on bottom WO 655
272/1216z	62°26.10	25°42.89	174	271.0°	0.7	584		"	sig -20db	hauling in
272/1237z	62°26.14	25°43.53	174	274.0°	0.5	590		"	sig -24db	dredge off bottom WO 595
272/1251z	62°26.20	25°43.99	174			595				dredge on deck
272/1305z	62°27.37	25°41.92		044.0°	11.6	640				under way to WP175
272/1322	62°29.38	25°38.81	175	157.0°	1.1	595	13419.0	mod. over 40m		at WP175, dredge deployed
272/1350z	62°29.39	25°38.67	175	253.0°	0.9	600		mod. over 75m	sig -26db	dredge on bottom WO 740-860
272/1358z	62°29.39	25°38.85	175	256.0°		560	13405.4	strong over 30m		hauling in
272/1426z	62°29.31	25°39.78	175	256.0°	0.6	525		strong over 30m		dredge off bottom WO 537
272/1443z	62°29.19	25°40.28	175			558				dredge on deck
272/1520z	62°30.48	25°31.79	176	144.0°	0.2	670	13394.1	weak over 80m	sig. -28db	at WP 176, dredge deployed
272/1538z	62°30.54	25°31.76	176	110.0°		675		weak over 100m	sig. -26db	dredge on bottom WO 720-876
272/1548z	62°30.57	25°31.62	176	118.0°		685		weak over 100m	sig. -21db	hauling in
272/1603z	62°30.63	25°31.22	176	117.0°	0.8	690		weak over 100m	sig. -26db	dredge off bottom WO 740
272/1632z	62°30.63	25°31.22	176							dredge on deck
272/1708z	62°34.93	25°92	177	288.0°		526	13410.5	mod. over 50m	sig. -18db	dredge deployed WP 177
272/1724z	62°35.06	25°28.08	177	225.0°		505		mod. over 75m	sig. -26db	dredge on bottom WO 647
272/1734z	62°35.06	25°28.35	177	162.0°	0.3	522	13411.3	mod. over 75m	sig. -24db	hauling in WO 685
272/1750z	62°35.02	25°28.12	177	148.0°	0.5	520		mod. over 75m	sig. -24db	dredge off bottom WO 516
272/1811z	62°34.88	25°28.32	177	287.0°	3.2	560	13409.3	mod. over 75m	sig. -24db	dredge on deck
272/1844z	62°38.68	25°23.67	178			503	13407.7	mod. over 70m	sig. -25db	dredge deployed WP178
272/1900z	62°38.75	25°23.45	178			500		mod. over 75m	sig. -18db	dredge on bottom WO 560
272/1900z	62°38.65	25°23.38	178	131.0°	1.0	541	13423.1	mod. over 75m	sig. -18db	hauling in Wo 708
272/1909z	62°38.57	25°22.97	178			512		mod. over 75m	sig. -18db	dredge off bottom WO 557
272/1944z	62°38.60	25°22.55	178	146.0°	0.1	538	13411.1	mod. over 75m	sig. -27db	dredge on deck
272/20000z	62°39.74	25°24.57		319.0°	9.7	686	13430.3	mod. over 40m	sig. -27db	change watch
272/2033zzz	62°41.46	25°27.65	α	098.0°	9.5	612		strong over 15m, fuzzy top	sig. -29db	SIMRAD survey
272/2100z	62°4100	25°18.94		101.0°	9.0	604	13384.4	mod. over 30m	sig. -20db	SIMRAD survey
272/2140z	62°40.17	25°05.88	β							SIMRAD survey
272/2200z	65°40.75	25°26.16		056.0°	3.8	529	13407.9	strong over 15m	sig. -24db	SIMRAD survey
272/2222z	65°42.20	25°00.29	χ					strong over 15m	sig. -24db	SIMRAD survey
272/2300z	62°43.29	25°12.06		279.0°	9.6	543	13455.9	mod. over 50m	sig. -21db	
272/2339z	62°44.62	25°25.02	δ	283.0°	10.0	611	13453.8	strong over 10m	sig. -24db	WP delta
273/0000z	62°42.83	25°25.27		091.0°	8.7	643	13408.6	strong over 10m		WP epsilon (change watch)
273/0109z										Under way to WP179
273/0125z	62°41.29	25°18.03	179	114.0°		503	13457.1	strong over 20m	sig. -21db	At WP 179, dredge deployed
273/0147z	62°41.46	25°17.86	179	122.0°	0.2	493		strong over 30m	sig. -23db	dredge on bottom WO 525-654
273/0156z	62°41.46	25°17.70	179	124.0°		480		strong over 30m	sig. -21db	hauling in
273/0220z	62°41.37	25°17.14	179	124.0°	0.6	454		strong over 30m	sig. -20b	dredge off bottom WO 454
273/0233z	62°41.17	25°16.53	179	136.9°		488				dredge on deck
273/0237z	62°41.13	25°16.02		093.0°	10.4	692		strong over 30m	sig. -24db	under way to WP 180
273/0332z	62°41.34	25°09.63	180	133.0°	0.9	570	13429.8	twin reflection at 530m and 590m	sig. -16db	dredge deployed
273/0336z								150m fuzzy return on bottom		
273/0350z	62°41.37	25°09.42	180	142.0°	0.3	515		twin reflection at 525m & 600m	sig. -20db	dredge on bottom WO 540-680
273/0358z	62°41.28	25°09.57	180	166.0°	0.4	520		twin reflection at 525m & 600m		hauling in
273/0430z	62°41.22	25°09.91	180	120.0°	0.1	562	13421.3	twin reflection	sig. -25db	dredge on deck
273/0538z	62°42.95	25°09.93	181	090.0°	0.1	433	13414.7	mod. over 15m	sig. -21db	dredge deployed
273/0552z	62°42.93	25°09.90	181	129.0°	0.7	434		mod. over 15m	sig. -11db	dredge on bottom WO 528

273/0602z	62°42.88	25°09.83	181	139.0°	1.0	426		mod. to strong.	sig. -20db	hauling in WO 657
273/0624z	62°42.93	25°09.83	181	103.0°	0.5	428	13423.0	mod. to strong.	sig. -6 db	dredge off bottom WO 470
273/0639z	62°43.05	25°05.28	181	113.0°	0.5	461		mod. to strong.	sig. -21db	dredge on deck
273/0716z	62°43.77	25°17.12	182	149.0°		487	13425.1	strong	sig. -20db	dredge deployed
273/0728z	62°43.74	25°17.07	182	137.0°	0.2	490		strong	sig. -19db	dredge on bottom WO 530 - 671
273/0738z	62°43.73	25°17.00	182	125.0°	1.0	501	13425.0	strong	sig. -18db	hauling in
273/0756z	62°43.62	25°16.72	182	132°	0.6	490	13423.3	Strong	sig. -10dB	Dredge off bottom w/o = 480
273/0816z	62°43.69	25°16.30	182	133°	0.1	457		Sharp and strong then waves over 80 m	sig. -22db	Dredge on deck
273/0901z	62°48.36	25°07.43		27°	4.4	524	13393.5		sig. -22dB	
273/0915z	62°48.34	25°06.85	183	130°	0.4	335		Sharp, med over 50m	sig. -25dB	At WP 183, dredge deployed
273/0930z	62°48.32	25°06.70	183	107°		343		Mod over 50m	sig. -28dB	Dredge on btm w/o 361
273/0936z	62°48.34	25°06.54	183	112°		325		Mod over 50m	sig. -27dB	Pinger 50m off btm w/o 524
273/0941z	62°48.33	25°06.32	183	107°	0.1	439		Mod over 70m		Dredge off bottom w/o 473
273/0948z	62°48.31	25°06.22	183	110°		503		Mod/weak over 70m		
273/1000z	62°48.29	25°05.94	183	114°	0.3	607	13423.7		sig. -15dB	
273/1007z	62°48.34	25°05.69	183	84°		639		Strong over 30m	sig. -10dB	Dredge on deck
273/1055z	62°52.07	25°03.49	184	115°		487		V strong over 10m		On station WP 184, dredge deployed
273/1100z	62°52.08	25°03.28	184	89°		478	13429.0	V strong over 10m	sig. -7dB	
273/1114z	62°52.10	25°02.99	184	110°		472		V strong over 10m	sig. -14dB	Dredge on btm w/o 489
273/1120z	62°52.09	25°02.88	184	125°		474		V strong over 1cm	sig. -16dB	Pinger 50m off btm w/o 645
273/1125z	62°52.07	25°02.75	184	11°	0.4	504		Strong over 20m	sig. -16dB	Hauling in
273/1132z	62°52.08	25°02.62	184	116°		551		Mod/strong over 50m	sig. -20dB	Dredge koff btm w/o 573
273/1155z	62°51.99	25°01.93	184	104.0°		516		Mod/strong over 50m		Dredge on deck
273/1200z	62°51.99	25°01.81		103°		512	13426.5		sig. -36dB	Change watch
273/1252z	62°55.89	24°47.30	185	123.0°		309	13425.9	Strong over ~75m	sig. -32dB	At WP 185
273/1255z	62°55.80	24°47.28	185	139.0°	0.2	251	13438.3	Strong over 100m	sig. -32dB	Dredge deployed
273/1307z	62°55.73	24°47.21	185	105.0°		233		Strong over ~75m		Dredge on bottom, wo = 293 Max 407
273/1316z	62°55.79	24°46.97	185	091.0°	0.5	267		strong over 40m	sig. -32db	hauling in
273/1324z	62°55.82	24°46.73	185	096.0°	0.7	324		strong over 20m		dredge off bottom WO 330m
273/1335	62°55.52	25°46.14	185			453				dredge on deck
273/1407z	62°59.95	24°46.80		350.0°	10.0	276				underway to WP186
273/1415z	62°00.67	24°45.66	186	095.0°	0.3	225	13454.7	strong over 40m	sig. -9db	dredge deployed
273/1426z	63°00.41	24°45.53	186	113.0°	0.4	225				dredge on bottom WO 240 - 410m
273/1437	63°00.36	24°44.72	186	095.0°	0.3	225		strong over 20m		hauling in
273/1454z	63°00.34	24°44.76	186	094.0°	0.6	233				dredge off bottom WO 233
273/1507z	63°00.19	24°44.26	186			257				dredge on deck
273/1640z										final dredge cancelled
273/1700zz	63°12.40	24°35.02		113.0°	9.7	264				start SIMRAD survey, WP S1
273/1744z	63°09.17	24°24.05	S1	213.0°	9.6	387	13256.7	strong		at WP S1
273/1812z	63°05.47	24°30.35								off line to avoid traffic
273/1831z	63°03.47	24°35.28		204.0°	9.3	360	13462.0			on line again
273/1848	63°07.20	24°37.81	S2	193.0°	9.2	444	13461.0			end of 1st line, starting turn
273/1900	62°59.39	24°34.23		083.0°	9.6	453	13442.0			
273/1908	63°00.69	24°35.82	S3	030.0°	10.1	366	13429.4			start 2nd line
273/1949	63°06.35	24°25.93		339.0°	10.8	345				leaving line to head 227°
273/2000	63°06.38	24°28.87		221.0°	11.0	353	13398.6			changing watch
273/2077z	63°01.90	24°39.40	S7	045.0°	10.9	255				at WP S7 (skipped WP S4-6)
273/2100z	63°03.46	24°36.59		039.0°	10.7	358	13426.2			
273/2147z	63°09.81	24°25.60	S8	040.0°	10.3	337				At SIMRAD WP S8
273/2148z										FINISH LOGGING

APPENDIX 2 : CD80 WAY POINTS

MAP REF.	WAY POINT	(Swell=S) DEPTH	(AVR=A) CODE	(Peak=P) (T=trough)	STATION TYPE	TARGETS Lat.	TARGETS Lon.	Dredge /Chip
A	WPA	_	_	_	SIMRAD SURVEY	57 32.00	33	_
B	WPB	_	_	_	SIMRAD SURVEY	57 47.40	32 31.80	_
C	WPC	_	_	_	SIMRAD SURVEY	57 46.00	32 27.50	_
D	WPD	_	_	_	SIMRAD SURVEY	57 31.00	32 55.00	_
1	WP1	1600	S1A1	P1	C. high	57 43.45	32 41.20	C
2	WP2	1575	S1A1	P1	C. high	57 44.20	32 41.60	D
3	WP3	1775	S1A1	P1	C.W. flank	57 44.30	32 42.80	C
4	WP4	1650	S1A1	P1	C.	57 45.90	32 41.10	C
5	WP5	1875	S1A1	P1	E. flank	57 47.60	32 41.40	C
6	WP6	1750	S1A1	P1	C.	57 47.85	32 40.20	C
7	WP7	1950	S1A1	P1	W. flank	57 47.85	32 39.20	C
8	WP8	1600	S1A1	P1	W. off axis	57 50.80	32 43.75	C
9	WP9	1875	S1A1	P1	W. off axis	57 50.45	32 40.85	C
10	WP10	1825	S1A1	P1	seamnt. W. flank	57 50.50	32 38.90	C
11	WP11	2150	S1A1	P1	tip basin sheet flow	57 50.32	32 36.80	C
E	WPE		_		SIMRAD SURVEY	57 44.40	32 25.30	_
F	WPF		_		SIMRAD SURVEY	57 24.20	32 56.50	_
12a	WP12		S jog		central ridge C	57 28.00	33 00.50	D
12b	WP13		S jog		central ridge N	57 30.50	33 00.30	C
12c	WP14		S jog		central ridge C	57 31.17	32 54.30	D
G	WPG		_		SIMRAD SURVEY			X
H	WPH		_		SIMRAD SURVEY			X
13	WP15	1750	S2A1	P2	S. tip	57 51.90	32 27.55	D
14	WP16	1850	S2A1	P2	E. flank S.	57 53.08	32 24.70	C
15	WP17	1725	S2A1	P2	C.S.	57 53.20	32 25.80	C
17	WP18	2600	S1A1	T1/2	fault wall in jog	57 54.75	32 30.80	D
19	WP19	1625	S2A1	P2	C.	57 55.15	32 25.45	C
21	WP20	1625	S2A1	P2	C. N.	57 56.18	32 25.50	C
23	WP21	1475	S2A1	P2	N. tip C. high	57 57.28	32 25.10	C
24	WP22	1600	S2A1	P2	W. flank: relict AVR	57 58.69	32 27.30	C
25	WP23	1600	S2A1	P2	N. tip	57 58.25	32 24.60	D
26	WP24	1675	S2A2	P2	S. tip	57 57.40	32 21.40	D
27	WP25	1525	S2A2	P2	C. S. high	57 58.29	32 20.65	C
27a	WP26	1650	S2A3	P2	S. tip high	57 56.30	32 20.00	D
28	WP27	1610	S2A1	P2	E. inter AVR	57 59.16	32 22.40	D
29	WP28	1625	S2A2	P2	C high	57 59.30	32 20.10	D
37	WP29	1575	S2A3	P2	S. tip of AVR	57 59.51	32 16.50	D
31	WP30	1800	S2A2	P2	E.C inter AVR	58 00.05	32 18.45	D
32	WP31	1650	S2A2	P2	centre AVR (low)	58 00.20	32 20.45	C
32a	WP31	1650	S2A2	P2	centre AVR (low)	58 00.20	32 20.45	CTD
33	WP32	1890	S2A2	P2	W. AVR flank	58 01.56	32 21.00	D
34	WP33	1650	S2A2	P2	N. C. high AVR	58 01.50	32 19.90	C
33a	WP33a	1700		P2	Inter-AVR super mounds	58 02.41	32 17.47	D
39	WP34	1600	S2A3	P2	C. high AVR	58 01.61	32 15.00	C
40	WP35	1650	S2A3	P2	C. N. AVR	58 02.80	32 14.35	C
36	WP36	1650	S2A2	P2	N. tip AVR	58 03.28	32 19.00	D
41	WP37	1600	S2A3	P2	N. tip AVR	58 04.00	32 14.00	D
43	WP38	1650	S2A4	P2	S. tip centre	58 04.44	32 12.90	D
44	WP39	1575	S2A4	P2	AVR centre high	58 05.30	32 12.55	D
46	WP40	1625	S2A4	P2	C. north high	58 06.70	32 12.10	D
47	WP41	1600	S2A4	P2	C north high	58 06.65	32 11.10	C
48	WP42	1650	S2A4	P2	N. tip AVR	58 09.51	32 10.30	D
49	WP43	1900	S3	P2	inter-swl basin W	58 10.35	32 07.40	D
I	WPI	-	-	-	SIMRAD	58 07.75	32 03.20	X
J	WPJ	-	-	-	SIMRAD	58 22.58	31 40.25	X
K	WPK	-	-	-	SIMRAD	58 20.95	31 36.50	X
L	WPL	-	-	-	SIMRAD	58 06.14	31 59.45	X
50	WP44	1650	S3	T2/3	S. AVR centre	58 11.00	32 04.00	D
51	WP45	1600	S3	T2/3	C. high AVR	58 12.05	32 04.55	D
53	WP46	1825	S3	P3	N.AVR S.tip	58 12.69	32 00.87	D
52	WP47	1775	S3	T2/3	S. AVR tip	58 13.68	32 02.15	D
54	WP48	1550	S3	P3	N. AVR S.C. HIGH	58 13.94	31 59.80	D
58	WP49	1725	S3	P3	E.side of V. N. AVR	58 15.49	31 55.45	D

APPENDIX 2 : CD80 WAY POINTS

56	WP50	1500	S3	P3	N.AVR S.C. high	58 15.58	31 58.95	D
60	WP51	1750	S3	P3	N.tip of N. AVR	58 16.66	31 59.68	D
62	WP52	1925	S4	T3/4	S. tip of AVR S.	58 17.98	31 55.35	C
63	WP53	1650	S4	T3/4	main AVR S. tip	58 17.80	31 52.60	C
65	WP54	1675	S4	T3/4	S. of high main AVR	58 19.13	31 52.24	C
66	WP55	1750	S4	T3/4	C at AVR S	58 19.70	31 54.75	C
67	WP56	1700	S4	T3/4	N. of AVR S	58 20.81	31 54.50	C
68	WP57	1425	S4	T3/4	S.high of main AVR	58 20.34	31 51.60	C
69	WP58	1450	S4	T3/4	seamnt on main AVI	58 22.59	31 49.40	D
70	WP59	1550	S4	T3/4	S tip of AVR	58 23.29	31 47.80	D
71	WP60	1425	S4	T3/4	C high of AVR	58 25.29	31 47.50	D
M	WPM	_	_	_	SIMRAD SURVEY	58 24.50	31 45.10	S
N	WPN	_	_	_	SIMRAD SURVEY	59 44.60	29 50.00	S
O	WPO	_	_	_	SIMRAD SURVEY	59 43.10	29 46.80	S
P	WPP	_	_	_	SIMRAD SURVEY	58 23.10	31 41.80	S
Q	WPQ	_	_	_	SIMRAD SURVEY	58 21.60	31 38.40	S
R	WPR	_	_	_	SIMRAD SURVEY	59 41.90	29 46.70	S
S	WPS	_	_	_	SIMRAD SURVEY	59 45.20	29 52.60	S
T	WPT	_	_	_	SIMRAD SURVEY	58 25.80	31 48.50	S
_	WP61	1370	S4		centre AVR	58 24.70	31 41.40	D
_	WP62	1170	S4		centre AVR	58 33.30	31 32.30	D
_	WP63	1150	S4		seamount AVR	58 34.80	31 31.80	D
73	WP64	1775	S4/P4	-	inter AVR basin	58 34.50	31 28.80	D
_	WP65	1400	S4/P4	-	S tip AVR	58 35.00	31 24.70	D
_	WP66	1175	S4/P4	-	centre AVR	58 39.60	31 20.70	D
_	WP67	1200	S4/P4	-	N tip AVR	58 42.30	31 19.00	D
_	WP68	1800	T4/5	-	inter AVR lava flow	58 43.10	31 15.40	D
_	WP69	1600	T4/5	-	S tip AVR	58 42.70	31 13.40	D
_	WP70	1450	T4/5	-	centre AVR	58 45.60	31 11.00	D
_	WP71	1650	T4/5	-	N & S tip AVR	58 47.80	31 09.20	D
_	WP72	1375	T4/5	-	Centre AVR	58 49.50	31 07.00	D
_	WP73	1600	T4/5	-	S tip AVR	58 46.60	31 08.02	D
U	WPU				SIMRAD SURVEY	58 52.16	31 16.30	S
V	WPV				SIMRAD SURVEY	59 13.30	30 45.60	S
W	WPW				SIMRAD SURVEY	58 52.20	30 29.80	S
X	WPX				SIMRAD SURVEY	58 41.80	31 04.50	S
Y	WPY				SIMRAD SURVEY	58 48.30	31 21.60	S
U'	WPU'				SIMRAD SURVEY	58 52.16	31 16.30	S
_	WP74	1370	S6	P6	N tip AVR	58 52.10	31 04.50	D
_	WP75	1125	S6	P6	S tip of AVR	58 50.50	31 01.00	D
_	WP76	1125	S6	P6	southern centre AVI	58 53.40	30 58.70	C
_	WP77	1200	S6	P6	Seamount inter AVF	58 54.30	30 55.80	C
_	WP78	999	S6	P6	center AVR	58 56.20	30 58.20	D
_	WP79	1275	S6	P6	Seamount southern	58 56.60	30 53.70	D
_	WP80	1150	S6	P6	N center AVR	58 58.10	30 55.90	D
_	WP81	1100	S6	P6	N AVR	58 59.60	30 55.40	D
_	WP82	999	S6	P6	central AVR	59 00.10	30 52.00	D
_	WP83	1125	S6	P6	S AVR	59 02.20	30 48.00	D
_	WP84	1125	S6	P6	Seamount centre A\	59 04.00	30 46.80	D
_	WP85					59 03.30	30 43.10	D
_	WP86					59 05.35	30 41.20	D
_	WP87	1052	S6	T6/7	Centre AVR	59 06.70	30 47.40	D
_	WP88					59 10.00	30 38.58	D
_	WP89					59 12.32	30 33.30	D
_	WP90					59 13.40	30 29.41	D
_	WP91					59 15.50	30 34.50	D
_	WP92					59 20.18	30 25.40	D
_	WP93					59 19.05	30 23.80	D
95'	WP94	1150				59 23.40	30 18.60	D
96'	WP95	1000				59 28.10	30 15.60	D
98'	WP96	1000				59 29.08	30 06.68	D
99'	WP97	1000				59 30.70	30 05.08	D
101'	WP98	800				59 35.80	30 02.20	D
102'	WP99	900				59 39.25	29 58.90	D
103'	WP100	900				59 40.30	29 52.60	D
104'	WP101	925				59 40.26	29 55.60	D

APPENDIX 2 : CD80 WAY POINTS

105'	WP102	725				59 43.68	29 51.30	D
74		775	S6	P6		59 39.52	29 58.50	D
107	WP103	800				59 46.65	29 50.45	D
77	WP104	925	S6	P6	S central AVR	59 47.87	29 47.20	D
79	WP105	700	S6	P6	central AVR	59 49.80	29 45.25	D
80	WP106	675	S6	P6	E flank AVR	59 49.73	29 42.82	D
82	WP107	925	S6	P6	central in wide AVR	59 51.43	29 43.80	D
82b	WP108	925				59 52.60	29 37.15	D
85	WP109	960	S6	T6/7	N tip of AVR	59 54.81	29 39.60	D
87	WP110	825	S6	T6/7	S/M in trough	59 57.65	29 36.20	D
87b	WP111	950				59 57.20	29 31.45	D
90	WP112	875	S7	P7	central AVR	59 59.95	29 29.10	D
94	WP113	950	S7	P7	southern tip	59 59.53	29 25.00	D
97	WP114	800	S7	P7	southern tip	60 00.98	29 20.15	D
98	WP115	775	S7	P7	central/east AVR	60 02.30	29 23.30	D
106	WP116	1000	S7	P7	southern tip	60 04.94	29 15.60	D
105	WP117	925	S7	P7	central AVR	60 05.57	29 19.18	D
104	WP118	900	S7	P7	northern tip	60 06.77	29 20.48	D
111	WP119	850	S7	P7	inter AVR seamount	60 07.57	29 15.40	D
114	WP120	625	S7	P7	AVR seamount	60 08.90	29 15.80	D
113	WP121	825	S7	P7	central	60 08.90	29 11.40	D
119	WP122	825	S7	P7	central S AVR	60 11.80	29 09.30	D
122	WP123	875	S7	P7	N tip of W AVR	60 13.60	29 12.40	D
125	WP124	500	S7	P7	central AVR	60 15.13	29 06.35	D
128	WP125	775	S7	P7	S northern AVR	60 18.39	29 05.20	D
131	WP126	825	S7	T7/8	S AVR	60 18.44	28 59.18	D
135	WP127	750	S7	P7	N tip AVR	60 21.90	29 02.55	D
138	WP128	850	S7	T7/8	central AVR	60 22.45	28 56.30	D
139	WP129	650	S7	T7/8	n/central AVR	60 24.06	28 54.30	D
140	WP130	750	S7	T7/8	north AVR	60 25.75	28 53.05	D
144	WP131	725	S7	P8	S AVR	60 27.77	28 42.70	D
146	WP132	575	S7	P8	central AVR	60 32.16	28 39.35	D
148	WP133	600	S7	P8	N AVR	60 35.94	28 36.30	D
194	WP134					60 40.70	28 27.60	D
195	WP135					60 43.25	28 24.80	D
196	WP136					60 49.90	28 14.80	D
197	WP137					60 52.35	28 14.50	D
198	WP138					60 56.70	28 05.60	D
199	WP139					61 00.10	28 03.00	D
200	WP140					61 01.45	27 57.30	D
201	WP141					61 05.30	27 51.20	D
202	WP142					61 11.00	27 42.60	D
203	WP143					61 15.75	27 35.80	D
204	WP144					61 17.50	27 36.20	D
205	WP145					61 20.60	27 26.04	D
206	WP146					61 24.40	27 24.60	D
207	WP147					61 27.80	27 14.70	D
start	start			storm	SIMRAD SURVEY	61 30.70	27 13.70	S
A'	A'			storm	SIMRAD SURVEY	61 34.60	27 07.70	S
B'	B'			storm	SIMRAD SURVEY	61 33.70	27 04.50	S
C'	C'			storm	SIMRAD SURVEY	61 23.60	27 19.75	S
D'	D'			storm	SIMRAD SURVEY	61 26.00	27 26.50	S
E'	E'			storm	SIMRAD SURVEY	61 35.90	27 11.25	S
F'	F'			storm	SIMRAD SURVEY	61 34.40	27 18.10	S
G'	G'			storm	SIMRAD SURVEY	61 36.80	27 14.40	S
H'	H'			storm	SIMRAD SURVEY	61 37.20	27 09.80	S
I'	I'			storm	SIMRAD SURVEY	61 41.20	27 02.40	S
J'	J'			storm	SIMRAD SURVEY	61 38.20	27 53.20	S
K'	K'			storm	SIMRAD SURVEY	61 21.20	27 09.10	S
L'	L'			storm	SIMRAD SURVEY	61 25.60	27 31.80	S
(F)'	(F)'			storm	SIMRAD SURVEY	61 34.40	27 18.10	S
M'	M'			storm	SIMRAD SURVEY	61 42.20	27 05.90	S
N'	N'			storm	SIMRAD SURVEY	61 43.25	27 06.10	S
O'	O'			storm	SIMRAD SURVEY	61 26.70	27 35.00	S
208	WP148					61 30.80	27 14.90	D
149	WP149	650	S10	P10	n tip AVR	61 29.60	27 10.80	D

APPENDIX 2 : CD80 WAY POINTS

151	WP150	650	S10	P10	S AVR	61 36.00	27 06.35	D
156	WP151	650	S10	P10	central avr	61 40.05	27 01.40	D
158	WP152	700	S10	P10	Northern AVR	61 42.62	26 58.40	D
160	WP153	600	S10	P10	Central AVR	61 43.79	26 54.10	D
160a	WP154	725	S10	P10		61 46.20	26 51.60	D
161	WP155	575	S10	P10	North AVR	61 46.80	26 46.45	D
162	WP156	550	S10	P10	North AVR	61 50.54	26 43.30	D
164	WP157	-775	S11	T10/11	South AVR	61 50.58	26 38.70	D
165a	WP158					61 52.93	26 41.15	D
168	WP159	-650	S11	T10/11	Central AVR	61 54.04	26 35.70	D
170	WP160	600	S11	T10/11	Central AVR	61 55.62	26 35.20	D
173	WP161	575	S11	T10/11	North of AVR	61 57.89	26 34.02	D
175a	WP162	700	S11	P11		62 00.07	26 26.93	D
176	WP163	-550	S11	P11	Southern end AVR	62 00.34	26 24.55	D
177	WP164	575	S11	P11	West AVR high	62 01.63	26 27.00	D
182	WP165	600	S11	P11	AVR East	62 04.31	26 21.07	D
185	WP166	525	S11	P11	AVR North	62 08.05	26 18.28	D
187	WP167	575	S11	P11	S tip AVR	62 08.87	26 11.00	D
	WP168	420	S11			62 11.91	26 07.80	D
191	WP169	450	S11	P11	Central AVR	62 14.45	26 07.00	D
209	WP170	600				62 17.00	26 05.75	D
210	WP171	650				62 18.10	25 55.30	D
211	WP172	500				62 21.95	25 53.00	D
212	WP173	700				62 24.20	25 51.20	D
213	WP174	600				62 26.08	25 42.70	D
214	WP175	500				62 29.35	25 38.80	D
215	WP176	650				62 30.45	25 31.95	D
216	WP177	550				62 35.00	25 28.20	D
α	α			SIMRAD SURVEY		62 41.40	25 27.50	S
β	β			SIMRAD SURVEY		62 40.20	25 05.75	S
χ	χ			SIMRAD SURVEY		62 42.11	25	S
δ	δ			SIMRAD SURVEY		62 44.60	25 24.50	S
ε	ε			SIMRAD SURVEY		62 42.90	25 26.00	S
φ	φ			SIMRAD SURVEY		62 42.10	25 13.50	S
217	WP178	500		dredge	central AVR	62 38.60	25 23.30	D
β	WP180	500		dredge	central AVR	62 41.00	25 10.60	D
γ	WP180	500		dredge	central AVR	62 43.60	25 10.20	D
δ	WP181	500		dredge	central AVR	62 43.70	25 17.10	D
218	WP182	300		dredge	central AVR	62 48.25	25 06.70	D
219	WP183	550		dredge	central AVR	62 52.05	25 03.30	D
220	WP184	350		dredge	central AVR	62 55.85	24 47.25	D
221	WP185	233		dredge	central AVR	62 55.73	24 47.21	D
222	WP186	267		dredge	central AVR	62 55.79	24 46.97	D

APPENDIX 3 : PETROS SAMPLE LOG

Cruise CD80- PETROS: SAMPLE LOG

Way Point	Sample Number	Sample Description
	WP# C=chipper; D=dredge; #.1,#.2, etc	sheet/pillow: glass/basalt etc: mineralogy sediment: colour, grain size, amount biology: anemone etc: frozen/alcohol
1	WP1C(test)	glass, fresh and altered, plag. Ø
1	WP1C(real)	glass, fresh and altered, plag. Ø
2	WP2D.1	pillow rim, alt., fresh glass, plag./ol. Ø
2	WP2D.2	glass sheet flow (8mm), fresh, a-Ø
2	WP2D.3	glassy pillow buds, fresh, ol. & plag. Ø
2	WP2D.4	glassy pillow buds, fresh, plag. & ol. Ø
2	WP2D.5 (i)-(iii)	glassy pillow shards, fresh, a-Ø
2	WP2D.6	>20cm dia. pillows; fresh glassy, plag. & ol. Ø
2	WP2H.1	sediment: volcanoclastic glassy sand and brown mud
3	WP3C	green-brown fresh glass, <1% plag + ol. Ø
3	WP3C.H	fine sand and glass, brown
4	WP4C	green glass, fresh, <1% plag. Ø
5	WP5C	green fresh and orange alt. glass, <1% plagØ
5	WP5C.H	pale brown mud
6	WP6C	microlitic opaque glass, fresh, ~10% plag. and ol. Ø
7	WP7C	dusty glass, plag. microlites, <1% plag. 4% ol. Ø
8	WP8C.H	only sediment, pale brown mud and sand grains
9	WP9C	opaque glass, microlites?, ~2% plag. +ol. Ø
10	WP10C	pale brown glass, fresh, <1% plag. and ol. Ø
10	WP10C.H	pale brown maud + silt
11	WP11D.1	ropey sheet flow, bslt gls, ol. + pl. Ø, stallate tex.
11	WP11H.1	green brown sediment mud, large amount.
11	WP11H.2	green brown sediment mud, large amount.
11	WP11H3	green brown sediment mud
12	WP12aD.1	a-Ø + sp.Ø glass shards.
12	WP12aD.2	large glassy chips
12	WP12aD.3	palg. Ø basalt
12	WP12aD.4	small glass fragments
12	WP12aD.5	basalt + glass, altered.
13	WP13D.1	sheet flow, ~2cm thick, glassy ol. + plag. Ø basalt.
13	WP13D.2	sheet flow <2cm thick, pl. Ø,
13	WP13D.3	sheet flow <2cm thick, pl. Ø,
13	WP13D.4	ropey sheet flow, (large frag)
13	WP13D.5	mixed glassy basalt frags, altered (pipe dredge)
13	WP13H.1	sediment, mud, pale brown
13	WP13H.2	sediment, mud, pale brown
14	WP14D.1	talus block of sheet flow, basalt
14	WP14D.2	talus block, ropey sheet flow, 25 cm thick,
14	WP14D.3	talus block, pillow, glassy rind, pPl. + ol. + sp. Ø
14	WP14D.4	talus block, pillow, glassy rind, pl. + ol. + sp. Ø
14	WP14D.5	talus block, pillow, glassy rind, pl. + ol. + sp. Ø
14	WP14D.6	talus block, dolerite, pl. + ol. + sp. Ø
14	WP14D.7	assorted frags. dolerite +basalt
14	WP14D.8	talus block, basalt, weathered, ol. Ø
14	WP14D.11	small glassy frags, fresh
14	WP14H.1	sediment/ pale brown
14	WP14H.2	sediment/ pale brown
14	WP14H.3	pale brown sediment
14	WP14B.1	15 cm diameter aneomone
14	WP14B.2	brittle stars, coral bits, and micro-sponges
15	WP15D.1	pillow basalt frags, glassy
15	WP15H.1	pale brown sediment mud
15	WP15H.2	pale brown sediment mud
16	WP16C	green isotropic glass+1 chip xtaline pl phyric
16	WP16C.H	Sediment, pale brown
17	WP17C.H	
17	WP17B.1	Corals
17R	WP17D.1	glassy rimmed pillow block
17R	WP17D.1.2	glassy fragments (fresh under microscope)
18	WP18B.1	Hairy thing (sponge?)
18	WP18B.2	more hairy things on slab
18	WP18B.3	sponge
18	WP18B.4	various fauna
18	WP18B.5	coral (myosa)
18	WP18D.1	glassy rimmed massive pillow flow, aphy-sp plag phy
18	WP18D.2	glassy rimmed massive pillow flow, aphy-sp plag phy
18	WP18D.3	doleritic massive flow or a dyke, plag phy, slightly altered x'als
18	WP18D.4	pillow, glassy rim aphyric, 1% vesicles
18	WP18D.5	glassy rimmed massive pillow flow, aphy-sp plag phy
18	WP18D.6	fine grained sparse stellate plag phy basalt
18	WP18D.7	fine grain, v sp plag phy, pillow chill without glass
18	WP18D.8	glassy chill margin to pillow flow, aphy fresh glass
18	WP18D.9	glass & basalt frfom mud & net, 4 bags in drawer
18	WP18H.1	brown silty sediment
18	WP18H.2	lithified sediment
19	WP19B.1	variuos fauna
19	WP19B.2	coral (scleratina), 14x8 cm

APPENDIX 3 : PETROS SAMPLE LOG

19	WP19H.1	fine grained mud
19	WP19H.2	fine mud
19	WP19H.3	glassy sed or hyal
20	WP20B.1	shells
20	WP20D.1	glass frags. from pipe dredge.
20	WP20D.2	basalt frags. from pipe dredge
20	WP20D.3	clinker
20	WP20D.4	glass rim, 2% vesicular, ,1% Ø, Mn-blackened
20	WP20D.5	glass rim, 2% vesicular, ,1% Ø, Mn-blackened
20	WP20D.6	chilled margin,vesicular, sparse Ø, Mn-blackened
20	WP20D.7	no chill margins, 2% vesic, plag. Ø 1mm xtls.
20	WP20H.1	pale brown silt
20	WP20H.2	pale brown silt
21	WP21D.1	small frags glass:50% fresh 50% devitrified
22	WP22B.2	Various Fauna
22	WP22B.3	various bio-fauna
22	WP22B.4	big coral
22	WP22D.1	11 frags aphiric pillow bslt,frags with glassy rims
22	WP22D.2	Misc pipe dredge contents
22	WP22D.3	Devitrified glass fragments
22	WP22H.1	Lithified mud
22	WP22H.2	Fossiliferous sediment foramifera bag
23	WP23D.1	v fine basalt,vesic,aphy
23	WP23D.2	Abund glass from sheetflow,fresh,aphy,vesic
23	WP23H.1	Sed brown
23	WP23H.2	sed brown
23	WP23B.1	Echinoderm in sed
23	WP23B.2	Varied bio
23	WP23B.3	Echinoderm hair+ microfauna
23	WP23B.4	Microfauna (forams etc)
24	WP24D.1	Erratics,granite,rounded basalt fragments
24	WP24D.2	Aphy.glassy,sheetflow top frags
24	WP24D.3	Highly plag phy,sheetflow top frags
24	WP24D.4	Aphy basalt+glass margin frag
24	WP24H.1	mud
24	WP24H.2	mud
25	WP25C	basalt fragments, no glass, no sediment.
26	WP26H.1	firm silt/mud
26	WP26H.2	firm silt/mud
26	WP26H.3	competent sand/mud ?tillite from erratic content see D.3
26	WP26D.1	erratic dropstone pebble, one
26	WP26D.2	few frags 2*glass, 2* erratic pebbles in same btle
26	WP26D.3	erratics from competent sed sample in dredge bag
27	WP27B.1	corals and fauna
27	WP27D.1	glass frags, not fresh. Basalt frags
27	WP27D.2	lge pillow blk. Mn covering-unfresh glass rim,vesicular
27	WP27D.3	rounded, Mn coated blks basalt, TS???
27	WP27H.1	light brown clay/fine grained
27	WP27H.2	light brown clay/fine grained
28	WP28B.1	micro fauna, poss forams, from dendritic cluster on rk
28	WP28B.2	coral
28	WP28D.1	glassy frags, poss varied origin
28	WP28D.2	WR basalt frags, aphyric-vsp. plag phy, vesic
28	WP28D.3	blocks pillow, aph-vsp pl phy, Mn coated
28	WP28D.3.1	glass rim from D3.1 pillow lava
28	WP28D.4	pillow lobe, fresh, plg phy (fragile)
28	WP28H.1	\sediment
28	WP28H.2	\sediment
29	WP29D.1	glass frags - sheet?aphyric
29	WP29D.2	glass with bits of vesicular aphyric basalt
29	WP29D.3	basalt-phyric + vesicualr (inner pillow frags)
29	WP29D.4	erratics
29	WP29D.5	vesicular basalt-30%, unknown
29	WP29B.1	coral
29	WP29B.2	coral, bivalves, various
29	WP29H.1	pale brown mud
29	WP29H.2	pale brown mud
29	WP29U.1	UNKNOWN, flat pieces of ships metal?????
30	WP30D.1	glass, fresh vesicular pillow rims, aphyric
30	WP30D.2	pillow baslt, basalt, glass vesicular aphyric
30	WP30D.3	basalt, little glass vesicular aphuric
30	WP30D.4	basalt & glass vesicular 1 % plag phyric
30	WP30D.5	basalt, glass rimmed, vesicular, plag phyric, photo taken
30	WP30H.1	pale brown mud/silt
30	WP30H.2	pale brown mud/silt
31	WP31C	fresh glass from the chipper
32	WP32D.1	glass, phyric, some alt. flow with flow texture
32	WP32H.1	beige sed. clay fine grained with silty grains, ? forams
32	WP32B.1	bio sample
32	WP32B.2	corals and sponge
33	WP33C.1	fresh glass
33A	WP33AD.1	whole plag phyric pillow glass from margin>33A D.1.1
33A	WP33AD.1.1	plag phyric glassy rim from lge pillow basalt 33A D.1
33A	WP33AD.2	basalt with glassy rims, plag phyric megaxsts part vesc

APPENDIX 3 : PETROS SAMPLE LOG

33A	WP33AD.3	basalt chunks ~25, plag phyric megaxsts part vesc
33A	WP33AD.4	dredge pipe glass, plag phyric, megaxsts part vesicular
33A	WP33AD.5	basalt,plag phyric, megaxsts, pillow margin
33A	WP33AD.6	basalt,plag phyric, megaxsts, pillow margin
33A	WP33AB.1	live coral, bivalve starfish
33A	WP33AB.2	assorted fauna, bryozoan, coral
33A	WP33AB.3	fine bio matter and glass
33A	WP33AH.1	pale brown sediment glass frags and mud
34	WP34C	brown fresh glass 15% plag to <5% oliv
35	WP35C	rim - vesic aphy. sample too small
36	WP36D.1	small basalt and glass frags
36	WP36D.2	10cm basalt fragments highly phyric
36	WP36D.3	volcanologically interesting glass fragments
36	WP36D.4	sheetflow,glassy surface,highly plag phyric.
36	WP36D.5	large blocks highly phyric sample
36	WP36B.1	small amounts of tests and corals
37	WP37B.1	varied biology
37	WP37B.2	forams,ventifera bits and other micro specimens
37	WP37D.1	Wr sample.Aph-specially phyric basalt
37	WP37D.2	glassy flow surface
37	WP37D.3	a few erratic pebbles
37	WP37H.1	sediment lump
37	WP37H.2	sed. lump
38	WP38D.1	4 glass chills from pillow margin-all plag phyric and megacrystic
38	WP38D.2	4 erratics,2rounded,2 glassy- latter may not be local,taken from pipe
38	WP38B.1	corals,some fauna and algae
38	WP38H.1	sed-sand size glass fragments in the silt/mud
38	WP38H.2	as above with some semi-lithified chunks of glass/silt/mud
39	WP39B.1	echinoderm spines,spongey specimen and fragments of bivalve
39	WP39D.1	fresh glass,light brown,aphyric with plag laths<1%sporadic olivine
39	WP39D.2	basalt sheetflow, glassy rim aphyric, vesicles, prominent pipe structure-superheated steam
39	WP39D.3	same as above
39	WP39H.1	possible contamination as sample dumped on deck
39	WP39H.2	fine grained mud/light brown-contaminated
39	WP39H.3	uncontaminated sample from sed in volatile holes in rock
40	WP40B.1	echinoderm etst and spines(frag.) coral. Stalked barnacle.
40	WP40B.1	sponge
40	WP40B.2	corals
40	WP40D.1	fresh glass
40	WP40D.2	pillow with glass
40	WP40D.2.1	glass with D.2 pillow
40	WP40D.3	curled pillow with glassy edge-altered
40	WP40D.4	sheetflow surface
40	WP40D.5	WR sample in small fragments,plag and olivine phyric
40	WP40D.6	WR sample with glass rinds
40	WP40D.7	large WR samples,plag and olivine phyric,Mn coating
40	WP40H.1	fine brown sed
42	WP42D.1	part of sheet flow with top and inner surfaces<0.5%plag@8%
42	WP42D.2	top chill fron sheet flow-fragments <12cm in diam.
42	WP42D.3	chill basalt from sheet,petrologically same as above
43	WP43B.1	pillow fragments with blue sponge jobbie on it
43	WP43B.2	asorted small bio fauna bits
43	WP43D.1	basalt,non gls,aphyric;sparse vesicles;pillow fragments from scree,5-20cm
43	WP43D.2	basalt,glassy aphyric sparse vesicles:pillow fragments
43	WP43D.3	as above
43	WP43D.4	non glassy,aphyric;non vesicles-hydrothermal staining
43	WP43D.5	basalt glass some aphyric,sparse vesicles,Mn staining
43	WP43D.6	small glass fragments,aphyric,non vesicles
43	WP43H.1	sed. pale brown mud
43	WP43H.2	as above
44	WP44B.1	forams
44	WP44B.2	corals
44	WP44D.1	small glassy frag,sp.ves
44	WP44D.2	sheet flow surface,sp ves
44	WP44D.3	very thin sheet flows,very sp plag phyric
44	WP44D.4	pillow,moderately fresh,vesic. vsp.plag phyric
44	WP44D.5	older looking basalt,Mn coating,non ves.
44	WP44D4.1	as D4,part of WR sample
44	WP44H.1	sed
44	WP44H.2	sed
45	WP45B.1	coral fragments
45	WP45B.2	large piece of coral and worm/sponge
45	WP45B.3	large piece of coral
45	WP45B.4	gastropods,forams,echinoderms,bivalve
45	WP45B.5	assorted fauna,mainly forams in glass fragments
45	WP45D.1	fresh glass fragments,AØ,vesicular,pillow?
45	WP45D.2	basalt,AØ,ves. Mn stained origin?
45	WP45D.3	Glass,AØ,vesicular.sp.,pillow?,fresh
45	WP45D.4	altered glass,mainly shards,pillow?sp.ves
46	WP46D.1	glass,aØ,vesic lots,sheet,fresh,no staining
46	WP46D.2	basaslt,aØ,vesic lots,pillow,fresh,no staining
46	WP46D.3	basalt,aØ,vesic lots,pillows,fresh, no staining
46	WP46D.4	glass, aØ, few vesc, fresh , no staining
46	WP46D.5	basalt, AØ, vesc lots, pillow, fresh, no staining

APPENDIX 3 : PETROS SAMPLE LOG

46	WP46D.5.1	glass,aØ, vesc none,pillow fresh, no staining
46	WP46D.6	basalt, AØ, vesc lots, pillow, fresh, no staining
46	WP46D.7	glass/basalt, aØ, few vesc, fresh
46	WP46H.1	fine grained mud. some silt grains? forams
46	WP46H.2	fine grained mud. some silt grains? forams
47	WP47B.1	assorted bio fauna with many spines & glass frags
47	WP47H.1	fine grained grey sediment, smelly -> anaerobic
47	WP47H.2	fine grained grey to beige seds, + very small. glass frags.
47	WP47H.2 (3?)	fine grained grey to beige sediment,smelly- anaerobic,small glass fragments
48	WP48C	aØ black glass
49	WP49D.1	basalt aØ,vesic few,pillow,fresh,no staining
49	WP49D.2	glass +basalt,aØ,vesic few,pillow,fresh,no staining
49	WP49D.3	glass,aØ,vesic none,pillow,fresh,no staining
49	WP49D.4	glass,aØ,vesic none,pillow,fresh,no staining
49	WP49D.5	basalt+glass,aØ,vesic none,pillow,fresh,no staining
49	WP49D.5.1	glass aØ,vesic none,pillow, fresh,no staining
49	WP49D.6	glass aØ,vesic few,pillow,fresh,no staining
49	WP49D.6.1	glass,aØ,vesic few,pillow,fresh,no staining
49	WP49D.7	basalt aØ,vesic none,pillow,alter,no staining
49	WP49D.8	basalt,aØ vesic few,interpil,fresh,no staining
49	WP49D.8.1	basalt,aØ,vesic few,ext pil,fresh,no staining
49	WP49D.9	basalt,aØ,vesic few,pillow,fresh,no staining
49	WP49D.10	basalt,aØ,vesic few-lots,pillow,fresh, no staining
49	WP49D.10.1	basalt+glass,aØ vesic lots,pillow,fresh,no staining
49	WP49D.11	basalt,aØ,vesic few,pillow,fresh,no staining
49	WP49D.11.1	basalt+glass,aØ,vesic few,pillow,fresh,no staining
50	WP50D.1	basalt,aØ,vesic few,pillow,few,no staining
50	WP50D.1.1	glass,aØ,vesic few,nd form,fresh,no staining
50	WP50D.2	basalt+glass,aØ,vesic few,pillow,alt,some Mn staining
50	WP50D.3	glass,aØ,vesic few,rim frags,fresh,no staining
50	WP50D.4	glass+basalt,aØ,pillow,fresh,some Mn staining
50	WP50D.5	glass,aØ,vesic few,shards,fresh,no staining
50	WP50D.7	basalt,aØ,vesic few,pillow,alt,some Mn staining
50	WP50D.8	basalt,aØ,vesic few,pillow,alt,some Mn staining
52	WP52C	black fresh glass aØ
52	WP52.1C (?)	black glass fresh
53	WP53C	black glass
54	WP54 C	mostly xstlne,some glass?????
55	WP55 C	
56	WP56C	glass
57	WP57C	glass
58	WP58B.1	assorted bio-fauna ,glass chips and coral
58	WP58D.1	glass+basalt aØ,vesic few,form nd,alt,some Mn staining
58	WP58H.1	silty mud with glass grains <0.1mm
58	WP58H.2	silty mud with glass grains <0.1mm
59	WP59D.1	glass+basalt,aØ,vesic few,pillow,fresh,no stainінng
59	WP59D.2	glass+basalt, aØ,vesic few,form nd,fresh,no staining
59	WP59B.1	corals
60	WP60B.1	horrible cartalidge +hairy/fibrous material
60	WP60B.2	sponges
60	WP60B.3	fibrous silica
60	WP60D.1	basalt,aØ,vesic lots,no staining
61	WP61 D.1	glass/basalt, ol, sp phy,lots vesc, sheet, mixed alteration, 8-10cm
61	WP61 D.2	glass/some basalt, aØ, lots vesc, pillow, mixed alteration, 10 pieces
61	WP61 D.3	glass & basalt, aØ, few vesc, pillow lava, fresh
61	WP61 D.4	glass & basalt, sp. ol phyric, few vesc, sheet, fresh
61	WP61 D.5	basalt & glass, aØ, few vesc.,sheet flow, mixed alteration
61	WP61 D.6	glass & basalt, sp. ol phyric, few vesc, N-D, mixed alteration
61	WP61 D.7	basalt, sp ol phyric, lots vesc, sheet
61	WP61 D.8	dolerite, high pl phyric, few vesc, no alteration
61	WP61 D.9	glass, aØ, no vesc, altered
61	WP61 D.10	erratics
61	WP61 D.11	glass& basalt, aØ, few vesc., N-D form,fresh
61	WP61 D.12	glass& basalt, aØ, few vesc., pillows,fresh
61	WP61 H.1	consolodated sed fine grain mud/beige colour
61	WP61 B.1	assorted fauna
62	WP62 D.1	basalt aØ,varied vesc. chunks, fresh
62	WP62 D.2	basalt & glass, aØ, varied vesc. chunks, fresh
62	WP62 D.3	basalt & glass, aØ, no vesc. sheet flow, fresh
62	WP62 D.3.1	glass, aØ, no vesc, shards, fresh
62	WP62 D.4	basalt,aØ, lots vesc. pillows fresh
62	WP62 D.4.1	glass, aØ, no vesc, pillow rims,fresh
62	WP62 D.5	basalt & glass, aØ, few vesc. pillows, fresh
62	WP62 D.6	basalt & glass, aØ, lots vesc. pillows, fresh
62	WP62 D.7	glass, aØ, form N-D, fresh, random frags
62	WP62 D.8	basalt & glass,aØ, no vesc., sheet flow, fresh, 2 bags same type
62	WP62 D.9	glass, aØ, shards, fresh, chips from pipe
62	WP62 D.10	basalt,aØ, lots vesc. pillows mod. alteration
62	WP62 D.11	basalt & glass, aØ, few vesc. sheet flow, fresh, volc. interesting
62	WP62 D.12	glass & corals intergrown, aØ, no vesc, fresh
62	WP62 B.1	assorted fauna- shrimp, sea anemone
62	WP62 B.2	coral & clam
63	WP63 D.1	glass,aØ, no vesc, sheet flow fresh, >20 pieces,
63	WP63 D.2	glass, aØ, no vesc, sheet flow, fresh, >20

APPENDIX 3 : PETROS SAMPLE LOG

63	WP63 D.3	glass & basalt, aØ, no vesc, sheet flow, fresh, 1 piece
63	WP63 D.4	basalt, aØ, no vesc, form ??, fresh, 10pieces
63	WP63 D.5	glass, aØ, no vesc, form N-D, fresh, >20 pieces
64	WP64D.1	Glass, aØ, no vesc, form ND, fresh, >20
64	WP64H.1	Brown silty mud
65	WP65D.1	Glass, big ol + Plag phen, Highly Ø, few vesicles, fresh, sheetflow, 2 peivces
65	WP65D.2	Glass, ol+plagØ, highly Ø, few vesc, sheetflow, fesh and altered, 7 peices
65	WP65D.3	Glass, ol+plagØ, highly Ø, few vesc, ND, fesh and altered, 5 peices
65	WP65D.4	Glass + Basalt, ol+plagØ, highly Ø, few vesc, sheetflow, fesh and altered, 5 peices
65	WP65D.5	Glass + Basalt, ol+plag, highly Ø, non-vesc, pillow, mixed, 1 peices
65	WP65D.5.1	Glass + Basalt, ol+plag, highly Ø, non-vesc, pillow, mixed, >20 peices
65	WP65D.6	Glass + Basalt, ol+plag, highly Ø, few vesc, ND form, altered, 1 peices
65	WP65D.7	Glass + Basalt, ol+plag, highly Ø, few vesc, sheetflow, altered, >20 peices
65	WP65D.8	Glass + Basalt, ol+plag, highly Ø, lots vesc, sheetflow?, mixed, 9 peices
65	WP65D.9	Glass + Basalt, ol+plag, highly Ø, few vesc, sheetflow, alt, 3 peices
65	WP65D.10	Glass + Basalt, ol+plag, highly Ø, non vesc, sheetflow, mixed, 7 peices
65	WP65H.1	fine-grained brown/beige mud and glass
65	WP65B.1	corals, gastropods, hairy things!
66	WP66D.1	Glass + Basalt, ol+plag, highly Ø, non vesc, sheetflow, fresh, 5 peices
66	WP66D.2	Glass + Basalt, ol+plag, highly Ø, lots vesc, pillow, fresh, 1 peices
66	WP66D.3	Glass + Basalt, ol+plag, highly Ø, non vesc, sheetflow, fresh, 1 peices
66	WP66D.4	Glass + Basalt, ol+plag, highly Ø, lots vesc, form ND, fresh, 1 peices
66	WP66D.5	Basalt, ol+plag, highly Ø, non vesc, form ND, fresh, 15 peices
66	WP66D.6	Basalt, ol+plag, highly Ø, non vesc, form ND, fresh, 20 peices
66	WP66D.7	Glass + Basalt, ol+plag, highly Ø, non vesc, form ND, fresh, 10 peices
66	WP66D.8	Glass, ol+plag, highly Ø, non vesc, form ND, fresh, 20 peices
66	WP66D.9	Glass + Basalt, ol+plag, highly Ø, few vesc, sheetflow, fresh, 5 peices
66	WP66D.10	Glass + Basalt, ol+plag, highly Ø, non vesc, sheetflow, fresh, 4 peices
66	WP66B.1	corals (2 sorts) & shells
67	WP67D.1	Basalt, ol+plag, highly Ø, lots vesc, pillow, mod fresh, Mn staining, 1 peices
67	WP67D.2	Basalt + glass, ol+plag, highly Ø, lots vesc, pillow, mod fresh, Mn staining, 1 peices
67	WP67D.3	Basalt + glass, ol+plag, highly Ø, lots vesc, form ND, mod fresh, Mn staining, 1 peices
67	WP67D.4	Basalt + glass, ol+plag, highly Ø, few vesc, form ND, mod fresh, Mn staining, 1 peices
67	WP67D.5	Basalt + glass, ol+plag, highly Ø, lots vesc, pillow, mod fresh, Mn staining, 1 peices
67	WP67D.6	Basalt + glass, plag, aØ-spØ, lots vesc, form ND, varied, mixed Mn staining, 8 peices
67	WP67D.7.1 & 7.2	Glass, ol+plag, highly Ø, sheetflow?, fresh, 8 peices
67	WP67D.8	Basalt, ol+plag, highly Ø, lots vesc, form ND, fresh, mixed Mn-Satining, >20 peices
67	WP67D.9	Basalt + glass, ol+plag, highly Ø, form ND, fresh, 10 peices
67	WP67D.10	Strange stuff, 1 peice
67	WP67D.11	Glass, ol+plag, sp Ø, form ND, fresh, Mn-Staining, >20 peices
67	WP67H.1	sediment in large basalt cavity
67	WP67B.1	corals, red star fish, echinoid spines
68	WP68D.1	Giass, aØ, non-vesc, sheetflow, fresh, 20 peices
68	WP68D.2	Glass, aØ, non-vesc, sheetflow, fresh, 15 peices
68	WP68D.3	Basalt, aØ, non-vesc, form ND, fresh, 10 peices
68	WP68H.1	sediment, moderately glutinous
68	WP68B.1	starfish
69	WP69D.1	Glass, plag, spØ, non vesc, sheetflow, fresh, 3 peices
70	WP70D.1	Glass, plag + ol, mod Ø, non vesc, sheetflow, mod fresh, 10 peices
70	WP70D.2	Glass, plag + ol, mod Ø, few vesc, form ND, altered, 20 peices
70	WP70D.3	Glass + Basalt, plag + ol, mod Ø, lots vesc, pillow, mod fresh, 1 peices
70	WP70D.3.1	Glass, plag, mod Ø, non vesc, pillow, variable freshness, 10 peices
70	WP70D.4	Glass + Basalt, plag, mod Ø, lots vesc, pillow, variable freshness, 1 peices
70	WP70D.5	Glass + Basalt, plag, mod Ø, few vesc, sheetflow, variable freshness, 3 peices
70	WP70D.6	Glass + Basalt, plag + ol, mod Ø, lots vesc, sheetflow, variable freshness, 1 peices
70	WP70H.1	muddy, silty brown/beige sed
70	WP70B.1	Corals plus other stuff(?)
70	WP70B.2	Corals,worms, bryozoans
71	WP71H.1	blue/grey silty mud
72	WP72D.1	dolerite + glass, ol phen, Sp Ø, non-vesc, form ND, fresh, 3 peices, 40-5 cm, with Mn-staining
72	WP72D.2	basalt + glass, ol phen, sp Ø, highly vesc, form ND, fresh, 2 peices <15 cm
72	WP72D.2.1	basalt + glass, ol phen, sp Ø, highly vesc, form ND, fresh, 3 peices <5 cm
72	WP72D.3	Basalt + glass, ol phen, spØ, few vesc, pillow lava, fresh, some blocks with Mn-staining, 8 peices, <50 cm
72	WP72D.3.1	Basalt, ol phen, spØ, few vesc, pillow lava, fresh, Mn-staining, 1 peices, 20 cm
72	WP72D.3.2	glass, fresh, 1 peice, <1 cm
72	WP72D.4	basalt + glass, a Ø, some vesic blocks, form ND, fresh, 5 peices <10 cms
72	WP72D.5	basalt, ol + plag highly Ø (small plags), non vesc, form ND, fresh, 1 peices, 5 cm
72	WP72D.6	basalt, aØ, scouraceous texture, form ND, fresh, 1 peice, 5 cm, Mn staining
72	WP72D.7	basalt, aØ, non-vesicular, form ND, altered?, 3 peices, 5 cm mn staining
72	WP72D.8	glass, aØ, varied vesc, form ND, fresh, ~10 peices <5 cms,
72	WP72D.9	glass, non-vesc, form ND, fresh, >20 peices <1cm
73	WP73D.1	basalt + glass, aØ, few vesc, form ND, 1 x 20 cm peice, Mn stained
73	WP73D.2	basalt + glass, aØ, non-vesc, form ND, fresh, 6 x <5 cm peices, Mn stained
74	WP74D.1	Basalt + glass, ol + plag phen, highly Ø, non-vesc, sheetflow?, fesh, 1 x 10 xcm peice
74	WP74D.2	glass, ol & plag phen, highly Ø, no vesc, sheet tops, fresh, 20 pieces, no staining
74	WP74D.3	glass, aØ, no vesc, form ND, 20 pieces, no staining
74	WP74 H.1	sediment
75	WP75 D.1	basalt & glass, plag & ol sp Ø, lots of vesc, sheet flow, fresh, no staining
75	WP75 D.2	basalt & glass, plag & ol sp Ø, lots of vesc, sheet flow, fresh, no staining
75	WP75 D.3	basalt, plag & ol sp Ø, lots of vesc, form ND, fresh, no staining
75	WP75 D.4	basalt, plag & ol sp Ø, lots of vesc, form ND, fresh, no staining
75	WP75 D.5	glass, pl & ol sp Ø, varied vesc, form ND, fresh, no staining
75	WP75 D.6	basalt & glass, plag & ol sp Ø, few vesc, pillow fresh, no staining
75	WP75 D.7	basalt & glass, plag & ol sp Ø, few vesc, pillow fresh, no staining

APPENDIX 3 : PETROS SAMPLE LOG

75	WP75 D.8	basalt & glass, plag & ol sp Ø, lots vesc, form ND, fresh, no staining
75	WP75 D.9	glass, fresh, form ND, no staining, 20 pieces
75	WP75 D.10	basalt & glass, pl & ol sp Ø, varied vesc, form ND, fresh, no staining
75	WP75 H.1	sponge & lobster
76	WP76 C	fresh & altered glass, plag phenocrysts, also mud and ??coral chips
77	WP77 C	fresh glass grains, some sand: calcarious etc., small sample
78	WP78D.1	basalt + glass, v. sparse ol-ø, some vesic.: pillow, alt. + fresh, 1 piece, <20 cm, Mn-stained,
78	WP78D.2	basalt+glass ,ol v.spø,some vesic,pillow,mixed alt,some Mn staining
78	WP78D.3	basalt, ol+plag v.sp ø,some vesic,mixed alt,some Mn staining
78	WP78D.4	glass+basalt,ol v.sp ø,some vesic,pillow,mixed alt,some Mn staining
78	WP78D.5	glass, a-ø, some vesic., fresh, not stained, 3 pieces, 5-10 cm
78	WP78D.6	assort. glass, sparsley pl.+ol.-ø, few vesic., alt. + fresh, no Mn-stais, >20, <3 cm,.
78	WP78B.1	green snot
78	WP78B.2	coral with lots of brittle starfish
78	WP78B.3	barnacles
78	WP78B.4	brittle stars +bivalves
78	WP78H.1	beige mud +glass
79	WP79D.1	glass + basalt, sparsley pl. + ol.-ø, lots vesic., sheet flow, alt. + fresh, 1 piece ~35 cm, no Mn-stain.
79	WP79D.1.1	glass aø few vesic,sheet flow,fresh
79	WP79D.2	glass+basalt,spø plag+ol,lots vesic,sheet flow,fresh
79	WP79D.3	glass,aø,few vesic,fresh
79	WP79B.1	assorted fauna
79	WP79B.2	glass fibrous sponge effort
79	WP79H.1	beige mud +glass
80	WP80D.1	basalt+glass,highly ø ol+plag,lots vesic,pillow,fresh
80	WP80D.1.1	glass,highly ø plag+ol,pillow,fresh
80	WP80D.2	baslat+glass,highly ø ol+plag,lots vesic,pillow,fresh
80	WP80D.3	basalt,highly ø ol+plag,lots vesic,fresh
80	WP80D.4	basalt+glass,highly ø ol+plag,lots vesic,fresh
80	WP80D.5	glass,highly ø plag+ol,fresh
80	WP80D.6	glass+basalt,highly ø plag+ol,lots vesic,fresh
81	WP81D.1	glass,sp ø plag+ol,few vesic,sheet,fresh
81	WP81D.2	glass,sp ø plag+ol,fresh
81	WP81D.3	glass,sp ø plag+ol,sheet?,fresh
81	WP81H.1	glass-rich brown sediment
82	WP82D.1	basalt+glass,a ø,few vesic,sheet,freshish
82	WP82D.2	basalt,a ø,lots vesic,alt,
82	WP82D.3	glass,a ø ,fresh
83	WP83D.1	glass+basalt,highø,plag/ol,few vesic,fresh
83	WP83B.1	bryozoa,sponges,coral,brittle starfish
84	WP84D.1	glass+basalt,high ø plag+ol,few vesic,sheet? alt,small Mn staining
85	WP85D.1	gneisses-erratics
85	WP85D.2	basalt,high ø ol,lots vesic,
85	WP85D.3	glass,sp ø ol, few vesic,fresh
85	WP85D.4	glass+basalt, ø ol,few vesic,sheet,mixed alt
85	WP85D.5	glass+basalt, high ø ol,lots vesic, mixed alt
85	WP85H.1	beige mud+bio+glass
85	WP85B.1	Echinoderm spines, silica sponge, gastropod etc
85	WP85B.2	sediment & microfauna & frags
86	WP86D.1	glass,high øplag,sheet?,fresh
86	WP86D2	basalt,high ø plag+ol,lots vesic,fresh
86	WP86D.3	glass,high ø plag+ol,lots vesic
86	WP86D.4	basalt,high plag+ol,lots vesic,sheet,fresh
86	WP86D.5	basalt,high ø plag+ol,lots vesic,fresh
86	WP86D.6	glass+basalt ø plag+ol,lots vesic,sheet,mixed
86	WP86D.7	glass,high ø plag+ol,lots vesic.fresh
86	WP86D.8	basalt+glass,high ø plag+ol,lots vesic,pillow?,mixed
86	WP86D.9	basalt,sp ø plag+ol,few vesic,pillow?,fresh
86	WP86H.1	beige mud
87	WP87D.1	erattics
87	WP87H.1	semi-consolidated sediment only
88	WP88D.1	Basalt + glass, plag, ol & px, highly Ø, lots vesc, pillow, fresh, 1 peices 30x30 cms
88	WP88D.2	Basalt + glass, plag phen, highly Ø, few vesc, form ND, fresh, 9 peices <5 cms
88	WP88D.3	Glass, plag phen, highly Ø, few vesc, sheetflow, fresh, 2 peices <4 cms
88	WP88H.1	Sed - pale brown mud
88	WP88B.1	Fine sponge
88	WP88B.2	Corlas & fauna
89	WP89D.1	Glass, plag & ol phen, highly Ø, non-vesc, sheetflow, fresh, 4 peices <8 cms
89	WP89B.1	Sponge & spinicles
90	WP90D.1	Basalt, plag phen, sp Ø, lots vesc, form ND, fresh/altered, 1 peice 15 cms, Mn staining
90	WP90D.2	Glass, plag & ol phen, sp Ø, non-vesc, sheetflow, fresh/alt, 7 bits <6 cms
91	WP91D.1	Glass, a-Ø, few vesc, form ND, fresh, >10 bits, 2 cms
91	WP91D.2	Glass, a-Ø, few vesc, form ND, fresh, >10 bits, 2 cms
91	WP91D.3	eratics
91	WP91H/B.1	Sed & bio
92	WP92D.1	Basalt & glass, Ol & plag, highly Ø, lots vesc, pillow, fresh, 1 peice 20x20cms
92	WP92D.2	Basalt, plag phen, sp Ø, lots vesc, pillow, mod fresh, 1 peice 30x20cms
92	WP92D.3	Basalt, Ol & plag phen, highly Ø, lots vesc, form ND, fresh, ~10 peice <5cms
92	WP92D.4	glass, Ol & plag phen, highly Ø, sheet/pillow tops, fresh, >20 peice <5cms
92	WP92D.5	Basalt & glass, Ol & plag phen, highly Ø, lots vesc, form ND, fresh, 3 peice <5cms

APPENDIX 3 : PETROS SAMPLE LOG

92	WP92D.6	glass, plag phen, highly Ø, form ND, fresh, >20 peice <1cms
93	WP93D.1	basalt, glass plag & ol Ø few-lots, few vesc, pillow, fresh/alt Mn stained
93	WP93D.1	basalt, glass plag & ol Ø few-lots, few vesc, pillow, fresh/alt Mn stained
93	WP93D.3	basalt, plag & ol Ø few-lots, few vesc, form ND, fresh/alt Mn stained
93	WP93D.4	basalt, plag & ol Ø few, few vesc, form ND, fresh/alt Mn stained,
93	WP93D.5	glass, plag & ol Ø few-lots, no vesc, form ND, fresh/alt Mn stained, 9 pieces
93	WP93B.1	gastropods, echinoid spines
93	WP93H.1	sed 2 samples one coarse and one fine
93	WP93H.2	hyaloclastite sand, sediment ...silt/clay penetrated/saturated sponge with umber
94	WP94D.1	glass, plag sp Ø, no vesc, form ND, mod fresh, no Mn staining, 5 pieces
94	WP94D.2	basalt, ol & plag sp Ø, few vesc, form ND, mod fresh, Mn staining, 2 pieces
94	WP94D.3	erratic
94	WP94H.1/2	sediment glass & silt & snad & forams
95	WP95D.1	glass, aØ, form - sediment, fresh, 1000s of small pieces
96	WP96D.1	basalt & glass, ol & plag v sp Ø, few vesc, pillow, fresh/alt, half a pillow?, no staining
96	WP96D.2	basalt & glass, ol & plag sp Ø, few vesc, form ND, fresh, no staining
96	WP96D.3	glass, pl & ol sp Ø, no vesc, sheet, fresh, no staining, 6 pieces
96	WP96D.4	glass, pl & ol sp Ø, no vesc, form ND, fresh, no staining, >20 pieces
96	WP96H.1	anemone
96	WP96B.2	corals
97	WP97D.1	glass, aØ, small zone of vesc, sheet, zero age ie FRESH no Mn staining
97	WP97D.2	glass & basalt, plag & ol sp Ø, lots of vesc, fresh sheet, 2 pieces, Mn stained
97	WP97D.3	glass & basalt, plag & ol sp Ø, lots of vesc, fresh sheet,1 pieces, Mn stained
97	WP97D.4	glass & basalt, plag & ol sp Ø, lots of vesc, fresh sheet, 1 pieces, Mn stained
97	WP97D.5	glass & basalt, plag & ol sp Ø, lots of vesc, fresh sheet, 1 pieces, Mn stained
97	WP97D.6	glass & basalt, plag & ol sp Ø, few vesc, sheet, fresh, 5 pieces, Mn stained
97	WP97D.7	glass & basalt, plag & ol sp Ø, few vesc, sheet, fresh, >5 pieces, Mn stained
97	WP97D.8	glass & basalt, plag & ol sp Ø, few vesc, sheet, fresh, >3 pieces, Mn stained
97	WP97D.9	glass & basalt, plag & ol sp Ø, few vesc, sheet, fresh, 4 pieces, Mn stained
97	WP97D.10	glass & basalt, plag & ol sp Ø, few vesc, sheet, fresh, 2 pieces, Mn stained
97	WP97D.11	glass & basalt, plag & ol sp Ø, lots of vesc, fresh sheet,10 pieces, Mn stained
97	WP97D.12	glass & basalt, plag & ol sp Ø, lots of vesc, fresh pillow, 2 pieces, Mn stained
97	WP97D.13	glass & basalt, plag & ol sp Ø, lots of vesc, fresh pillow, 2 pieces, Mn stained
97	WP97D.14	glass & basalt, plag & ol sp Ø, lots of vesc, fresh pillow, 1 pieces, Mn stained
97	WP97D.15	glass & basalt, plag & ol sp Ø, lots of vesc, fresh pillow, 2 pieces, Mn stained
97	WP97D.16	glass, plag & ol highly Ø, few vesc, form ND, v. fresh, >20 pieces, not stained
97	WP97D.17	glass & basalt, plag & ol sp Ø, lots of vesc, fresh sheet, 10 pieces, Mn stained
97	WP97D.18	glass, ol & plag sp Ø, few vesc, sheet fresh, 2 pieces, not stained
97	WP97B.1	anemones
97	WP97B.2	soft coral
98	WP97D.1	glass, ol spl Ø, few vesc, form ND, fresh, > 20 pieces, not stained
98	WP97D.2	glass & basalt ol & plag sp Ø, few vesc, sheet fresh, 15 pieces, Mn staining
98	WP97D.3	glass & basalt, ol highly Ø, lots of vesc, fresh sheet, 6 pieces, Mn staining
98	WP97H.1a	glass rich sed, forams
98	WP97H.1b	glass rich sed, forams
98	WP97B.1	frondy pink plant
98	WP97B.2	coral and hairy thing & red entrails!!!!!!!!!!!!!!!
99	WP99D.1	glass & basalt, aØ, few vesc, pillow fresh, 2 pieces, Mn stained
99	WP99D.2	glass & basalt, v sp ol Ø, few vesc, sheet fresh, 7 pieces, no staining
99	WP99D.3	glass & basalt, v sp ol Ø, few vesc, sheet fresh, 5 pieces, no staining
99	WP99D.4	glass & basalt, v sp ol Ø, few vesc, sheet fresh, 2 pieces, some staining?
99	WP99D.5	glass & basalt, v sp ol Ø, no vesc, sheet/pillow fresh, 3 pieces, no staining
99	WP99D.6	basalt, plag/ol v.sp Ø, varied vesc, form ND, mod fresh, 8 pieces, lots of staining
99	WP99D.7	glass, aØ, avesc,form ND, varied freshness, 10 pieces, no staining
99	WP99H.1	glass rich sediment/ hyaloclastite debris
99	WP99H.2	glass rich sediment/ hyaloclastite debris
99	WP99B.1	frondy pink plant like thing & 2 corals
100	WP100D.1	basalt +glass; ol+plag phenocrysts; v.sparsely Ø; few vesicles; sheet form;fresh; 3pcs ~40cm;sack; Mn stained;
100	WP100D.2	erratic
100	WP100D.3	basalt +glass; ol+plag phcrytsts; v.sp Ø; few vscls; sheet form;fresh; 5 pcs <7cm; parcel/drawer; No Mn stain;
100	WP100D.4	glass; plag; v.sp Ø; no vscls; thin sheets; altered; 2 pcs <7cm; parcel/drawer; No Mn stain;
100	WP100D.5	basalt + glass; ol +plag; v.sp Ø; lots vcscls; form ND; fresh; 1 pcs <10cm: sack; Mn stain;
100	WP100D.6	basalt; ol +plag; v.sp Ø; lots vscls; form ND; fresh; 9 pcs <5 cm; parcel/drawer; No Mn stain
100	WP100D.7	basalt; ol; v.sp Ø; form ND; 1 pcs 4cm; bag/drawer; Mn stain
100	WP100D.8	glass; ol; v.sp Ø; few vscls; form ND; fresh; 1 pcs 8cm; bag/drawer;
100	WP100D.9	basalt + glass; ol; v.sp Ø; lots vscls; pillows; fresh; 5 pcs <20cm; sack; Mn stain
100	WP100D.10	glass; a-Ø; varied vscls; form ND; varied altd/fresh; >20 pcs <10cm; parcel/drawer;
100	WP100D.11	glass; form ND; altered; >20pcs <10cm; bag/drawer;
101	WP101D.1	glass; a-Ø; few small vscls; mody fresh; 2 pcs <4cm; bag/drawer; No Mn stain;
101	WP101D.2	basalt + glass; a-Ø; sheet form; altd; 2 pcs ~ 5cm; bag/drawer/ strong Mn stain
101	WP101D.3	glass; a-Ø; rind form; altd; 8 pcs < 5cm; bag/drawer; strong Mn stain
101	WP101D.4	hyaloclastite; a-Ø; hyalocl form; very altd; 2 pcs <3cm bag/drawer; clay matrix, glass frags
102	WP102D.1	glass; ol; lots vscls; bits; freshish; >20pcs <2cm; bottle/drawer
102	WP102D.2	glass; plag;few vsclc; sheet form; altd; 15 pcs <4cm; bag/drawer; no Mn stain
102	WP102D.3	baslat +glass; plag; lots phycrsts, few vscls; pillow form; freshish; 1 pcs 15cm; sack;
102	WP102D.4	basalt; plag; lots phycrsts, few vscls; pillow form, freshsih; 1 pcs 5cm; sack;
102	WP102D.5	basalt/glass; plag; lots phycrsts, few vscls; pillow form, fesh; 1pcs 30cm; sack
102	WP102D.6	baslat/glass; plag; lots phycrsts, few vscls; sheet flow, freshish; 1 pcs at 20cm; sack;
102	WP 102 B1	

APPENDIX 3 : PETROS SAMPLE LOG

102	WP102B.1	clam
102	WP102B.2	soft polyps + coral;
103	WP103B.1	barnacles + blk coral; Mn stained
103	WP103D.1	basalt; ol; sp. Ø; lots vscls; pillow; 1 pc 20-30cm;
103	WP103D.2	basalt; no phycrsts; a-Ø; few vscls; pillow; altd; 6 pcs 10-20cm;;
103	WP103D.3	baslat/glass; plag; sp. Ø; lots vscls; form ND; altd; 6 pcs 2-5cm;
103	WP103D.4	baslat/glass; ol; sp Ø; lots vscls; form ND; mixed fresh/altd; 6 pcs 1-7cm;
104	WP104B.1	white "leggy thing" poss a lobster
104	WP104D.1	Basalt + glass, ol + plag phen, highly Ø, lots vesc, sheetflow, fresh, 2 peices 10-20 cms, Mn staining
104	WP104D.2	Basalt + glass, ol + plag phen, highly Ø, lots vesc, sheetflow, fresh, 3 peices 15-20 cms, Mn staining
104	WP104D.3	Basalt + glass, ol + plag phen, highly Ø, lots vesc, sheetflow, fresh, 10 peices 5-10 cms, Mn staining
104	WP104D.4	Glass, ol + plag phen, sp Ø, few vesc, form ND, varied freshness, >20 peices 2-5 cms, Mn staining
104	WP104D.5	Glass, ol + plag phen, sp Ø, few vesc, form ND, altered, >20 peices 2-5 cms, Mn staining
104	WP104D.6	Basalt, ol + plag phen, highly Ø, lots vesc, pillow, 5 peices 10-20 cms
104	WP104D.7	Basalt + glass, ol + plag phen, highly Ø, lots vesc, sheetflow, Altered, 4 peices 15-20 cms
104	WP104D.8	Basalt, ol + plag phen, highly Ø, lots vesc, pillow, 1 peices 5 cms
104	WP104D.8.1	Glass, ol + plag phen, sp Ø, lots vesc, pillow, altered, >10 peices 1 cm
104	WP104H.1	beige sed and glass
105	WP105D.1	Basalt + glass, ol + plag phen, highly Ø, few vesc, sheetflow, fresh, 6 peices <40 cms
105	WP105D.2	Basalt, ol + plag phen, highly Ø, lots vesc, form ND, fresh, 4 peices <40 cms
105	WP105D.3	Glass, ol + plag phen, highly Ø, form ND, fresh, >20 peices <10 cms
106	WP106 B.1	frondy rubbery thing
106	WP106D.1	Basalt + glass, ol + plag + CPX phen, highly Ø, few vesc, form ND, fresh, 6 peices <10 cms
106	WP106D.2	Basalt, ol + plag phen, highly Ø, varied amounts vesc, form ND, fresh, >20 peices <5 cms
106	WP106D.3	Glass, ol + plag phen, highly Ø, form ND, fresh, ~20 peices <4 cms
106	WP106H.1	glass rich sandy sed
107	WP107 B.1	brittle stars,small sponges,small rogose coral
107	WP107D.1	Basalt + glass, ol + plag phen, highly Ø, few vesc, sheetflow, fresh, 5 peices <20 cms
107	WP107D.2	glass, ol + plag phen, sp Ø, non vesc, form ND, fresh, >20 peices <2 cms
107	WP107D.3	glass, ol + plag phen, sp Ø, non vesc, form ND, varied freshness, 2 peices <50 cms
107	WP107D.4	glass, plag phen, sp Ø, few vesc, sheetflow, freshish, 15 peices <8 cms
107	WP107D.5	glass, ol + plag phen, sp Ø, non vesc, sheet, varied freshness, 5 peices <10 cms
107	WP107D.6	glass, plag phen, sp Ø, non vesc, mixed form, varied freshness, >10 peices <2 cms
108	WP108B.1	shrimp
108	WP108D.1	basalt +glass,plag and ol phen,lots Ø and few vesc,fresh sheetflow.1peice
108	WP108D.2	basalt +glass,plag and ol phen,lots Ø and few vesc,fresh sheetflow.1peice,some Mn staining
108	WP108D.3	basalt +glass,plag and ol phen,lots Ø and few vesc,fresh sheetflow.6peices
108	WP108D.4	glass,plag and ol phen,lots Ø and few vesc,fresh sheetflow.6peices,some Mn staining
108	WP108D.5	glass,plag and ol phen,lots Ø and few vesc,fresh sheetflow.14peices,some Mn staining
108	WP108D.6	basalt,plag and ol phen,lots Ø and few vesc,fresh sheetflow.10peices,some Mn staining
108	WP108D.7	glass,plag and ol phen,lots Ø and few vesc,fresh sheetflow.>20peices,some Mn staining
109	WP109D.1	basalt,plag and ol phen,sp phyric,few-lots vesicles,ND form,fresh,6 peices
109	WP109D.2	glass,plag and ol phen,very sp phyric,very few vesicles,ND form,fresh,6 peices
109	WP109D.3	glass,plag +ol,v sp phyris.few vesicles,form ND,fresh,10 peices
109	WP109D.4	glass,aphyric.few vesicles,form ND,fresh,>10 peices
110	WP110D.1	basalt,plag phen,highly Ø lots vesicles with ND form,10 peices with MN staining
111	WP111D.1	glass,plag phen,sp Ø,few vesicles,fresh ND form >5 peices
111	WP111D.2	basalt and glass,no phen,aphyric few vesicles,altered but ND form,6peices
112	WP112D.1	basalt and glass,plag,ol and cpx phen,highly phyric,lots vesicles,fresh ND form,5 peices
112	WP112D.2	basalt and glass,plag and ol phen,highly phyric,lots vesicles,fresh ND form,4 peices
112	WP112D.3	glass,plag,ol and cpx phen,highly phyric,non vesicles,fresh ND form,>20 peices
112	WP112D.4	basalt,plag,ol and cpx phen,highly phyric,varied vesicles,altered ND form,~10 peices
113	WP113D.1	glass, plag, sp.Ø; few vscls; form ND; not fresh; 1 pcs 2cm; bag/drawer;
114	WP114D.1	glass; no phycrsts; a-Ø; no vscls, form ND; altd; >20 pcs 2-3cm;
114	WP114D.2	basalt, a-Ø; few vscls, form ND; altd; 20 pcs 2-4cm;
114	WP114D.3	sed/glass; plag, sp. Ø; no vscls; form=hyalo+sed; altd; 4 pcs 3-20cm; Mn stain
114	WP114D.2	erratics
115	WP115D.1	glass + baslat; plag, pyrox, ol; very Ø, few vscls; sheet form; fresh; 13 pcs <20cm
115	WP115D.2	baslat + glass; plag, pyrox; few-lots Ø; lots vscls, form ND; freshish; 1 pcs <20cm; some Mn stain;
116	WP116D.1	glass; pl +ol; sp. Ø; few vscls; form ND; freshish; >20pcs 1-2cm; Mn stain
116	WP116D.2	glass; plag,ol,cpx; highly Ø; few vscls; form ND; altd; >20pcs 2-7cm;
116	WP116D.3	basalt +glass, plag; sp. Ø; lots vscls; form ND: fresh; >20pcs 2-5cm;
116	WP116D.4	baslat +glass; plag,ol,cpx; highly Ø; few vscls, sheet form, altd; 10pcs 5-15cm;
116	WP116D.6	basalt + glass; plag,ol; sp. Ø; few vscls, sheet form, altd; 2pcs 20-30cm; Mn stains
116	WP116D.7	baslat +glass; plag, ol; highly Ø; few vscls, sheet form, altd; 5pcs 103-0cm; Mn stains
116	WP116D.8	glass+baslat; plag + ol; sp. Ø; few vscls, form ND, fresh; 1pcs 10cm;
116	WP116B.1	shrimps, sponge + brittl star
116	WP116B.2	hairy sponge with coral
116	WP117H.1	beige sed with micro-fauna + glass
117	WP117D.1	glass; plag, ol, cpx; highly Ø; few vscls; form ND; mixed fresh/altd; 10 pcs 5-10cm; Mn stain;
117	WP117D.2	basalt; plag, ol ,cpx; highly Ø; few vscls, sheet, mixed fresh/altd; 5pcs 10cm;
117	WP117D.4	basalt +glass; plag, ol, cpx; highly Ø; few vscls, sheet, mixed fresh/altd; 1pcs 20cm
117	WP117B.1	groovy blue/purple sponge +hairies
118	WP118D.1	basalt + glass; ol, plag, cpx; highly Ø; few vscls, form ND, freshish; >20pcs <10cm;
118	WP118B.1	sponge/bryozoa; large >20cm
118	WP118B.2	starfish
119	WP119D.1	basalt; ol+ plag; sp Ø; few vscls, form ND, fresh; 3pcs <5cm;
119	WP119D.2	basalt + glass; ol, plag; sp. Ø; lots vscls, form ND fresh; 1pcs <15cm;
119	WP119D.2.1	glass; form ND; altd; 5pcs <2cm;

APPENDIX 3 : PETROS SAMPLE LOG

119	WP118D.3	erratics
119	WP119D.4	glass; plag, ol; sp. Ø form ND fresh; 15pcs <3cm;
119	WP119D.5	glass; form ND; fresh; >20pcs <0.5cm;
119	WP119B.1	God knows!!
119	WP119H.1	glass-rich sediment
119	WP119H.2	non-glass-rich sediment horizon
120	WP120D.1	glass; pl +cpx; highly Ø; form ND, fresh; 4pcs <5cm
120	WP120B.1	young and old coral, various types; starfish
120	WP120B.2	echinoids
121	WP121D.1	basalt; a-Ø; few vscls, form ND, altd/fresh; 2pcs 15cm; Mn stain
121	WP121D.2	baslat; plag; few Ø; few vscls, form ND, fresh/altd; 2pcs 8cm;
121	WP121D.3	basalt +glass; plag; few-lots Ø; few vscls, sheet form;fresh/altd; 3pcs 5-15cm;
121	WP121D.4	baslat + glass; plag; sp. Ø; few vscls, form ND, fresh/altd; 3pcs 5-20cm; Mn stain
121	WP121D.5	baslat + glass; plag; sp.Ø; few vscls, form ND, fresh/altd; 1pcs 20cm
121	WP121D.6	basalt +glass; plag; sp. Ø, few vscls, form ND fresh/altd; 1pcs 20cm
121	WP121D.7	baslat + glass; plag, ol; lots Ø; few-lots vscls; pillow; altd, 1pcs 30cm
121	WP121D.8	basalt + glass; plag, cpx; few-lots vscls; pillow, altd; 2pcs 20cm; Mn stain
121	WP121B.1	soft coral, cauliflower - pink + gastropod
121	WP121H.1	consolidated ooze with baslat/glass
122	WP122D.1	glass;plag+ol;spØ;lots veic;form ND;alt/fresh;<20<5cm
122	WP122D.2	glass+basalt;plag+ol;high Ø;few vesic;sheet form;freshish;aopcs<5cm
122	WP122D.3	basalt;plag+ol;highØ;lots vesic;form ND;10 pcs<5cm
122	WP122D.4	glass+basalt;plag;highØ;few vesic;sheet form;freshish;1 piece 30 cm
122	WP122D.5	glass+basalt;plag+ol;highØ;lots vesic;pillow form;mixed;1 piece 50 cm
122	WP122D.6	glass+basalt;plag+ol;highØ;lots vesic;pillow form;alt;1 piece 30cm
122	WP122D.7	glass;plag;spØ;few vesic;form ND;mixed alt;6 pieces 2-5cm
122	WP122B.1	bivalve +brittle starfish
122	WP122H.1	glass fragments with small amount of sed +micro-fauna
122	WP122H.2	beige mud,fine grained
123	WP123H.1	beige mud with silica bio fibres
123	WP123H.2	consolidated agglomerate of fibrous material,glass and beige sed
123	WP123B.1	small mollusca <0.5cm
123	WP123D.1	erratics 7pieces
123	WP123D.2	glass;aØ;few vesic;form ND;mixed alt;1 piece 5cm
124	WP124D.1	basalt;ol;spØ;varied vesic;fom ND;fresh;3 pcs<4cm
124	WP124B.1	Satrfish
124	WP124B.2	corals
125	WP125D.1	Basalt, plag phen, sp Ø, varied vesc, mod fresh pillow lava, 10 peices, <30cms, with MN staining,
125	WP125D.2	Basalt + glass, plag (mega) + ol phen, mod Ø, lots vesc, freshish pillow, 6 peices, <20cms, with MN staining,
125	WP125D.3	Basalt, plag + ol phen, mod Ø, few vesc, mod fresh pillow, 4 peices, <30cms, no MN staining,
125	WP125D.4	Basalt +glass, plag + ol + cpx phen, mod Ø, lots small vesc, fresh pillow, 4 peices, <30cms, some MN staining,
125	WP125D.5	Basalt + glass, plag (mega) + ol + cpx phen, highly Ø, lots vesc, mod fresh pillow, 1 peices, 30cms, some MN staining,
125	WP125D.6	Basalt +glass, plag + ol phen, highly Ø, few vesc, mod fresh pillow, 1 peices, <75cms, MN staining,
125	WP125D.7	Basalt +glass, plag + ol phen, highly Ø, few vesc, varied freshness, form ND, 8 peices, 2-5cms, MN staining
125	WP125D.8	Basalt, plag (mega) + ol phen, highly Ø, few vesc, varied freshness, form ND, >20 peices, 2cms, some MN staining
125	WP125D.9	Basalt, plag (mega) + ol + cpx (?) phen, highly Ø, lots vesc, varied freshness, form ND, 10 peices, 5cms
125	WP125D.10	Basalt, a Ø, lots vesc, form ND, 2 peices, 7cms, Mn staining
125	WP125D.11	Basalt, plag phen, highly Ø, lots vesc form ND, 1 peice, 10cms
125	WP125B.1	soft coral and shrimp
125	WP125B.1	corals & bivalves
125	WP125H.1	biol rich-sediment, very coarse
126	WP126D.1	Basalt + glass, plag + ol phen, highly Ø, few vesc, varied freshness, form ND, >10 peices, 1-10cms
126	WP126D.2	Basalt + glass, plag + ol phen, highly Ø, lots vesc, altered, form ND, 10 peices, 10cms
127	WP127D.1	Glass, plag + ol phen, highly Ø, few vesc, freshd, form ND, >5 peices, 1cms
127	WP127D.2	Basalt, a Ø, lots vesc, fresh, form ND, 2 peices, 2cms
127	WP127D.3	Basalt, Plag + ol phen, highly Ø, few vesc, form ND, 10 peices, 2-5cms
127	WP127D.4	Glass, plag + ol phen, highly Ø, few vesc, varied freshness, form ND, 6 peices, 5-7cms
127	WP127B.1	Assorted fragmented fauna, microfauna, forams and gastropods
127	WP127H.1	Hairy fibrous sediment, bio within, beige
128	WP128D.1	glass; plag; highly Ø; form ND, fresh; >20pcs <5cm
128	WP128D.2	basalt; a-Ø; few vscls; Form ND fresh; 10 pcs <5cm;
128	WP128D.3	baslat + glass; ol plag; highly Ø; lots vscls; form ND fresh; 10 pcs <15cm; Mn stain
128	WP128D.6	ditto - 1pc 30cm
128	WP128D.5	baslat, ol, plag, higly Ø; vescls; form ND fresh; 1pcs 30cm Mn stain
128	WP128D.4	basalt; ol, plag; higly Ø, vsclr, form ND; fresh ^pcs <20cm; varied Mn stain
128	WP128B.1	varied bio
129	WP129D.1	basalt + glass; plag + cpx; highly Ø; few vscls, pillow form, fresh; 1pc 50cm sack
129	WP129D.2	baslat + glass; plag + cpx; highly Ø; few vscls; pillow, fresh; 1pcs 30cm
129	WP129D.3	basalt + glass; plag + cpx, highly Ø; few vscls, pillow fresh; 5pcs <10cm
129	WP129D.4	basalt + glass; ol plag; highly Ø; lots vscls, form ND, altd; 1pcs 8cm;Mn stain
129	WP129D.5	basalt + glass; ol, plag; mod Ø, few vscls; pillow, freshish; 11pcs <15cm;
129	WP129D.6	glass; ol, plag; mod Ø; few vscls; form ND; mod/fresh; 9pcs <10cm;
129	WP129D.7	baslat + glass; ol, plag; mod Ø, few vescls; fresh pillow; 3pcs <20cm
129	WP129D.8	baslat; dolerite ol plag; mod-highly Ø; no vscls, form Intrusive; freshish; 2pcs <12cm;
129	WP129B.1	clam
129	WP129B.2	coral + part of clam
130	WP130D.1	basalt; plag, ol cpx; higly Ø; few vscls, form ND; fresh; 18pcs <20cm
130	WP130D.2	basalt+ glass; plag, ol cpx; higly Ø; few vscls, sheet form; 1pcs < 30cm;
131	WP131D.1	glass, sparsely ol-ø, few vesicules, no Mn stain, fresh, sheet flow, >20 pieces, ~1 cm

APPENDIX 3 : PETROS SAMPLE LOG

131	WP131D.2	glass + baslt, sparse ol-ø, lots vesics., no Mn stain, fresh sheet flow, > 20 pieces, 2-5 cm.
132	WP132D.1	baslt, sparse ol-ø, lots vesics., no Mn stain, fresh, form nd, 1 piece, 30 cm.
132	WP132D.2	baslt + glass, sparse ol-ø, lots vesics, no Mn-stain, fresh, form nd, 1 piece, 25 cm.
132	WP132D.3	Baslt + glass, highly ol-ø, lots of vesics., form nd, no Mn-stains, fresh, 2 pieces, 10-30cm.
132	WP132D.4	baslt, sparse ol-ø, lots vesics., no form, fresh no Mn-stain, 1 piece, 15cm,
132	WP132D.5	baslt. + glass, sparse ol- + pl-ø, no form, fresh, no Mn-stain, 2 pieces, <15 cm.
132	WP132D.6	baslt. + glass, a-ø, lots vesics., no form, altrd., Mn-stained, 1 piece, 10cm,
132	WP132D.7	baslt + glass, vry sp. ol-ø, lots vesics, no form, fresh, no Mn-stain, 1 piece, 30 cm.
132	WP132D.8	baslt + glass, sparse pl- & ol-ø, lots vesics, pillopw, fresh, no-Mn-stain, 1 piece, 45 cm.
132	WP132D.9	baslt. + glass, variable ø, variable vesic, 15+ pieces, <10 cm, alt. & fresh, no Mn-stain.
132	WP132D.10	baslt. + glass, variable ø, variable vesic, >20 + pieces, <5 cm, alt. & fresh, no Mn-stain.
132	WP132B.1	big falic coral/sponges
132	WP132B.2	regular type of coral
132	WP132B.3	echinoid & microfauna
133	WP133D.1	glass, pl Ø, no vesc, ND form , fresh no Mn staining, >1000, <1cm
133	WP133D.2	bassalt, v sp pl & ol Ø, lots of vesc, form ND, altered and Mn stained, I piece, 15 cm
133	WP133D.3	glass, sp pl & ol Ø, few vesc, sheet flow, fresh no staining, >10 pieces, <10cm
133	WP133D.4	basalt & glass, sp pl & ol Ø, varied vesc, ND form, fresh, no staining, >4 pieces, <5cm
133	WP133B.1	corals and sponges
133	WP133B.2	silicon fibres
133	WP133H.1	glassy sed no ooze, just glass and bio frags
134	WP134D.1	glass, aØ , no form fresh no Mn staining, <0.5cm
134	WP134D.2	glass & basalt, pl & ol variable Ø, variable vesc, no form, freshish, 12 pieces, <3cm, no staining
134	WP134B.1	sponges algae and bivalves
134	WP134H.1	glassy sed and bio frags
135	WP135D.1	basalt & glass, very pl, ol & cpx Ø, few vesc, no form , freshish, Mn staining, 4 pieces, >20cm
135	WP135D.2	basalt, pl & ol Ø, few vesc , sheet flow, freshish, Mn stained, 2-4 pieces, 15 cm
135	WP135D.3	basalt & glass, pl & ol sp Ø, few vesc, no form, fresh, no staining, 6 pieces <15cm
135	WP135D.4	basalt & glass, various Ø, various vesc, no form, various, 20 pieces <2cm
136	WP136D.1	basalt & glass, highly pl Ø, lots of vesc, sheet flow, fresh, 1 piece, 10cm
136	WP136D.2	basalt & glass, highly pl &ol Ø, lots of vesc, sheet flow, altered, no staining,3 pieces, 5-15cm
136	WP136D.3	glass, pl & ol highly Ø, few vesc, no form, altered, >10pieces, <5cm
136	WP136H.1	beige mud
136	WP136B.1	bright yellow gunge, whole echinoid large brittle star
137	WP137D.1	glass, aØ, no vesc, no form, very altered, >50 pieces, <0.25cm
137	WP137D.2	glass & basalt, aØ, few vesc, pillow lava, altered, 1 piece, 40 cm
137	WP137D.3	glass & basalt, aØ, lots vesc, pillow lava, alteration mixed, >10pieces, 5-30 cm
137	WP137D.4	basalt, aØ, lots of vesc, pillow, 3 pieces, 10-20cm
137	WP137D.5	glass & basalt, aØ, no vesc, pillow lava, altered , 4pieces, 20-30 cm
137	WP137D.6	altered hyaloclastite
137	WP137D.7	glass & basalt, aØ, lots vesc, no form, altered , 7pieces, 2-5 cm
137	WP137D.8	basalt, aØ, no vesc, no form, >20 pieces, <7 cm
137	WP137D.9	basalt & glass, aØ, lots of vesc, pillow lava, variable alteration, Mn stained, 1 piece, 20cm
137	WP137D.10	glass, hyaloclastite???
138	WP138D.1	erratics
138	WP138D.2	glass; plag; highly Ø; vscls, blob form, moderately altd; 1 pcs 20cm
138	WP138D.3	basalt varied phycrsysts - poss small lumps of a diffferent a-Ø basalt type.
138	WP138D.4	basalt, ol+plag; sp-high Ø; form ND fresh; 6pcs <2cm;
138	WP138D.5	glass, plag, highly Ø; pillow, sheet tops; varied altd/fresh; >20pcs <10cm
138	WP138D.6	glass, plag, highly Ø; varied altd/fresh; 15pcs <5cm
138	WP138D.7	basalt, plag ol, highly Ø; lots vscls, form ND fresh; 6 pcs <10cm
139	WP139D.1	basalt, plag, ol cpx, highly Ø; lots vscls, form ND, fresh; 1pcs 40cm Mn stain
139	WP139D.2	basalt + glass, no phycrsts, a-Ø; few vscls, form ND, altd; 3pcs stuck together, 15cm;Mn stain
139	WP139D.3	basalt + glass; ol, plag, cpx; highly Ø; lots vscls, form ND fresh; 8pcs <10cm;
139	WP139D.4	glass, plag, higly Ø; form ND fresh; >20pcs <10cm;
139	WP139D.5	glass, a-Ø; form ND mod/fresh; >20pcs <9cm
139	WP139D.6	basalt, a-Ø; few vscls, form ND; 3pcs <8cm; Mn stain
139	WP139D.7	basalt, plag, ol, v.sp.Ø; lots vscls, form ND, mod fresh; 2pcs < 5cmMn stain
140	Wp140D.1	basalt + glass; plag, ol, highly Ø; few vscls, pillow form, fresh; 3pcs 15-20cm; Mn stain
140	WP140D.2	basalt, plag, ol, highly Ø; fe-lots vscls; form ND fresh; 6pcs 5-10cm; Mn stain
140	WP140D.3	glass, pl+ol, highly Ø; few vscls, form ND, fresh; >20pcs <3cm;
140	WP140D.4	basalt, plag, ol, sp. Ø; few vscls, form ND fresh; 7pcs 10cm; Mn stain
140	WP140D.5	glass + plag,ol,cpx, higly Ø; few vscls, form ND, fresh; 17pcs 5-10cm; Mn stain
140	WP140D.6	basalt, pl,ol,highly Ø; few vscls, pillow form fresh; 1pcs Mn stain
140	WP140D.7	basalt, a-Ø; lots vscls, form ND, freshish; 4pcs <5cm Mn stain
140	WP140B.1	corals, algae, clams, gastropod
141	WP141D.1	glass, ol & pl highly Ø, lots of vesc, no form, mixed alteration, >10 pieces, < 0.25 cm, no staining
141	WP141D.2	glass, ol & pl highly Ø, lots of vesc, no form, fresh, 10 pieces, < 5 cm, no staining
141	WP141D.3	basalt & glass, ol & pl highly Ø, lots of vesc, no form, mixed alteration, 10 pieces, < 7 cm, no staining
141	WP141D.4	basalt & glass, pl & ol highly Ø, lots of vesc, sheet, mixed alteration, 2 pieces, 7-15 cm, no staining
141	WP141D.5	glass, no form, fresh, lots of pieces, <0.25cm, no staining
141	WP141H.1	fine mud & glass
141	WP141B.1	brittle starfish, fragments of bivalves
141	WP141B.2	glass with microfauna
142	WP142D.1	basalt & glass pl & ol & cpx highly phyric few vesc no form, altered, 1 piece 10 cm
142	WP142D.2	basalt & glass pl & ol highly phyric few vesicles no form freshish, 1piece 4cm
142A	WP142B.1	2x branched flora
142A	WP142B.2	asssorted fauna - corals starfish, bryazoa sponge clams
142	WP142B.1	corals

APPENDIX 3 : PETROS SAMPLE LOG

143	WP143D.1	glass, aphyric, few vesicles, no form, fresh, >10 pieces, <2cm,
143	WP143D.2	basalt & glass, pl (few) aphyric, few vesic, no form, freshish, >20 pieces,
144	WP144D.1	basalt & glass, pl,ol & cpx highly phyric, few/no vesic, sheet flow, freshish, >20 piece,2-20cm
144	WP144D.2	basalt & glass pl, ol & cpx, highly phyric, few-lots vesic,no form, freshish, 5pieces, < 20 cm,
144	WP144D.3	basalt, pl, ol & cpx, highly phyric, few-lots vesic,no form, freshish, 16 pieces, 6- 2 cm,
144	WP144D.4	glass, pl, ol & cpx, few phyric, few vesic,no form, freshish, 5 pieces, <15 cm,
144	WP144B.1	assorted fauna corals starfish and bivalves
145	WP145D.1	glass & basalt, pl ol cpx highly Ø, lots of vesc, sheet flow, freshish, >10 pieces, no staining, <15cm
145	WP145D.2	glass , pl ol cpx few Ø, lots of vesc, sheet flow, freshish, >20 pieces, no staining, <3cm
145	WP145D.3	basalt, pl & ol highly Ø, lots of vesc, pillow?, fresh, 1piece, 30 cm
145	WP145B.1	corals, clams, shrimps, anemones and starfish
146	WP146D.1	basalt, pl ol cpx few Ø, lots of vesc, no form, freshish, >10 pieces, some staining, 1-15cm
146	WP146D.2	glass, pl ol cpx sparce Ø, lots of vesc, no form, mixed alteration, >20 pieces, no staining, <5cm
146	WP146D.3	glass & basalt, pl ol cpx few Ø, lots of vesc, sheet, freshish, 2 pieces, no staining, 6cm
146	WP146D.4	basalt, pl sparcely Ø, lots of vesc, no form, fresh, 1 piece, 40 cm, no staining
146	WP146B.1.	bio, brittle stars, yucky sponge, & hairies
147	WP147D.1	sed & glass
147	WP147D.2	basalt, pl very sparcely Ø, few vesc, no form, fresh, 10 pieces, <4 cm, Mn staining
147	WP147D.3	basalt & glass, pl very sparcely Ø, varied vesc, no form, iron stained alteration, >20 bits, <8cm, Mn stained
147	WP147D.4	glass, aØ, varied vesc, no form , fresh, no staining, >20 bits, <3cm
147	WP147D.5	basalt & glass, aØ, lots of vesc, sheet , fresh, Mn staining, 1 piece, 40cm
147	WP147D.6	basalt & glass, aØ, lots of vesc, sheet , fresh, Fe staining, 2 pieces, <15cm
147	WP147D.7	basalt , aØ, lots of vesc, no form, Fe staining, 10 pieces, <3cm
147	WP147D.8	basalt & glass, aØ, lots of vesc, no form, Fe staining, <20 pieces, <10cm
147	WP147B.1	corals & small disc like sponges and tree like thing
147	WP147B.2	microfauna
148	WP148D.1	Erratics
148	WP148H.1	Coarse mud with glass & micro-fauna - semi-consolidated
148	WP148H.2	consolidated mud
149	WP149D.1	Basalt & glass, ol + plag sp Ø,few vesc, form ND, fresh, >15 peices, <10cm
149	WP149D.2	Glass, ol + plag sp Ø,few vesc, form ND, fresh, >30 peices, <3cm
149	WP149D3	Basalt & glass, ol + plag sp Ø,lots vesc, form ND, fresh, 6 peices, <15cm
149	WP149B.1	frondy thing
149	WP149B.2	assorted bio
150	WP150D1	glass; ol, highly Ø; form ND fresh; >20pcs under 5cm
150	WP150D2	basalt, ol higly Ø; lots vscls, form ND fresh; 10pcs under 10cm
150	WP150 D3	basalt + glass, ol, highly Ø; lots vscls, sheet form, fresh; 1pcs 10cm
151	WP151 D1	basalt + glass, ol+plag, a- to sp. Ø; few vscsls, form ND freshish; >30pcs under 5cm;
151	WP151 D2	glass, a-Ø; few vscls, form ND fresh; 20pcs <3cm
151	WP151 D3	basalt + glass, ol+palg, few-lots Ø; lots vscls, form ND, altd; 10pcs <10cm
151	WP151 H1	consolidated -soft mud
151	WP151 H2	biofrags + glass
151	WP151 B1	assd biofauna + glass
152	WP152 D1	basalt + glass; ol+plag; few-lots Ø; few vscls, sheet form, freshish; 4[pcs 10-30cm
152	WP152 D2	basalt + glass, plag (few) a-Ø; lots vscls, sheet form, freshish; 1pcs 15cm;
152	WP152 D3	basalt, ol+plag, few Ø; lots vscls, sheet form, altd; 1pcs 10cm, Mn stain
152	WP152 D4	basalt+ glass, ol+plag, few-lots Ø; few vscls, sheet form, freshish; 17pcs 3-10cm;
152	WP152 D5	basalt; ol+plag, few to a-Ø; few vscls, form ND fresh; 10pcs <3cm;
152	WP152 D6	basalt, a-Ø; lots vscls, form ND, altd; 1pcs 7cm
152	WP152 D7	basalt + glass; ol+plag; few-lots vscls; few vscls, form ND freshish;>15pcs 8cm
152	WP152 D8	erratics 16pcs <10cm
153	WP153 D1	basalt a-Ø; few vscls, form ND freshish; 1pcs 16cm; Mn stain
153	WP153 D2	basalt + glass; ol; v.v.sp.Ø; few vscls, form ND freshish 17pcs <5cm
153	WP153 D3	ditto - 4pcs < 20cm
153	WP153 D4	glass, a-Ø; few vscls, form ND freshish; 3pcs <6cm
153	WP153 D5	basalt, a-Ø; lots vscls, form ND, altd; 2pcs <3cm
153	WP153 D6	glass, a-Ø; lots vscls, form ND, altered; >50pcs <4cm
153	WP153 H1	glass + mud; soft brown beige
153	WP153B1	coral, sponges, bivalve, brittle star
154	WP154 D1	glass + basalt, a-Ø; lots vscls, form ND freshish; @pcs <15cm
154	WP154 D2	glass + basalt; plag, v.sp Ø; few vscls, form ND freshish; 6pcs < 15cm
154	WP154 D3	glass + basalt; a-Ø; lots vscls, sheet form fresh; 5pcs < 5cm
154	WP154 D4	glass, a-Ø; lots vscls, form ND mixed altd; 2pcs <5cm;
154	WP154 D5	basalt; plag, v.sp Ø; lots vscls, form ND; 5pcs < 5cm
154	WP154 H1	beige mud + some glass fragments + micro fauna
154	WP154 B1	hairy sponge
154	WP154 B2	solitary corals, spones, bryozoa, bivalves andn forams.
155	WP155 D1	basalt + glass; a-Ø; lots vscls, hyaloclastite form, fresh;
155	WP155 D2	glass, a-Ø; no vscls, hyaloclastite form, fresh; <10pcs <3cm
155	WP155 D3	glass + basalt; a-Ø, lots vscls, 6pcs <4cm
155	WP155 D4	glass + basalt, a-Ø lots vscls, form ND frsh; 1pcs 40cm
155	WP155 D5	glass, a-Ø; lots vscls, form ND fresh; pcs <0.5cm
155	WP155 D6	basalt + glass; a-Ø; lots vscls, pillow form, fresh; 1pcs 20cm
155	WP155 D7	basalt, a-Ø; lotsd vscls, form ND
155	WP155 B1	sponges
155	WP155 B2	coral
156	WP156 D1	glass, a-Ø; form ND fresh; >20pcs <5cm
156	WP156 D2	basalt + glass, ol sp. Ø; few vsclcs, sheet form, fresh; 13pcs <10cm
156	WP156 D3	basalt + glass; ol+ plag; sp.Ø; varied vscls, form ND, fresh; 8pcs <5cm

APPENDIX 3 : PETROS SAMPLE LOG

157	Wp157 D1	glass; form ND, fresh; >20pcs <3cm
157	WP157 D2	basalt + glass; a-Ø; varied vscvls, form ND fresh; 20pcs < 3cm
157	WP157 D3	basal + glass, a-Ø; lots vscls, form ND freshish; 2pcs < 30cm; Mn stain
157	WP157 D4	basalt, a-Ø; lots vscls, form ND, older; 1pcs 35cm; Mn stain
157	WP157 D5	basalt, a-Ø; lots vscls, form ND older; 10pcs <10cm
157	WP157 D6	basalt + glass, a-Ø; lots vscls, form ND fresh; 1pcs <12cm, Mn stain
157	Wp157 D7	basalt + glass, a-Ø; lots vscls, sheet form, mod altd, 1pcs < 8cm Mn stain
157	WP157 D8	basalt: a-Ø; lots vscls, form ND mod altd; 10pcs < 10cm; Mn stain
157	WP157 D9	basalt + g;lass; a-Ø; lots vscls, sheet form, fresh; 10pcs < 10cm Mn stain
157	WP157 H1	glassy sed
157	WP157 B1	assorted fauna
158	WP158 D1	glass; a-Ø; form ND, fresh; >20pcs <4cm
158	WP158 H1	sed with silica spines
158	WP158 D2	basalt + g;lass; ol pyyric; few vscls, no form, fresh; 3pcs < 20cm Mn stain
158	WP158 D3	basalt + glass;ol + pl sp-Ø; few vscls, no form, freshish; 3 pcs < 6cm Mn stain
158	WP158 D4	basalt + glass; ol +pl sp-Ø; lots vscls, no form, freshish; >5pcs < 5cm; no stain
158	WP158 D5	basalt; ol +pl sp-Ø; lots vscls, no form, fresh; >20pcs < 5cm no stain
158	WP158 D6	basalt + glass; a-Ø; few vscls, sheet form, fresh; 1 pcs < 5cm Mn stain
158	WP158 B1	assorted fauna
158	WP158 B2	star fish
159	WP159 D1	basalt & glass; ol +pl; vv.sp-Ø; lots vscls, pillow form?, freshish; 3pcs 10-25 cm no stain
159	WP159 D2	basalt & glass; ol +pl; vv.sp-Ø; lots vscls, pillow form?, freshish;21pcs 2-10 cm no stain
159	WP159 D3	glass; a-Ø; few vscls, no form, fresh; >20pcs < 2cm no stain
159	WP159 D4	glass; a-Ø; few vscls, no form, fresh; >20pcs < 2cm no stain
159	WP159 B1	assorted fauna
159	WP159 B2	star shapped echiniderm
160	WP160 D1	glass; ol sp-pyyric; lots vscls, no form, fresh; >20pcs < 7cm no stain
160	WP160 D2	glass, ol ,sp. Ø; lots vscls, form ND freshish; >20pcs <4cm;
160	WP160 D3	basalt, ol sp. Ø; lots vscls, form ND freshish; >20pcs <10cm;
160	WP160 D4	basalt, glass, ol, sp.Ø; lots vscls, sheet form fresh; 8pcs <20cm;
160	WP160 D5	glass, a-Ø; vbl vscls, form ND fresh; >20pcs <2cm
160	WP160 B1	worms, sponge and algae
160	WP160 B2	star fish, corals and worms
161	WP161 D1	basalt, glass; ol,plag, cpx; sp.-high Ø; lots vscls, sheet form fresh; 5pcs <30cm
161	WP161 D2	basalt, glass, ol, cpx, high Ø; lots vscls, tube form fresh; 1pcs 20cm; Mn stain
161	WP161 D3	glass, ol plag, Ø; few vscls, form ND fresh; >20pcs <2cm
161	WP161 D4	glass, ol plag, highly Ø; few vscls, form ND fresh; 15pcs <5cm
161	WP161 D5	glass, basalt, ol plag, sp. Ø;lots vscls, sheet form fresh;
161	WP161 D6	glass, basalt, ol, plag; high Ø; lots vscls, form ND fresh; >20pcs <7cm
162	WP162 D1	basalt, ol, plag,cpx; high Ø; lots vscsl, form ND; <10pcs <5cm
162	WP162 D2	basalt glass, ol, plag, cpx; high Ø; lots vscsls, sheet form fresh; 4pcs <7cm
162	WP162 D3	glass, ol, plag, high Ø; lots vscls, form ND fresh; <10pcs <2cm;
162	WP162 D4	glass, ol plag, med Ø; lots vscls, form ND mixed fresh/altd; >30pcs <7cm
162	WP162 H1	beige mud with silica spines and mud
162	WP162 B1	soft sponge and silica spicules
162	WP162 B2	corals, sponge and bivalve shells
163	WP163 D1	glass, ol Plag, sp. Ø; lots vscls, form ND, mixed fresh/altd; >20pcs <3cm
163	WP163 D2	basalt + glass, ol plag, sp. Ø; lots vscls, form ND mixed fresh/altd; 10pcs <10cm Mn stain
163	WP163 D3	basalt glass, ol plag, sp. Ø; very vsclsr, form ND, moderately altd 2pcs <30cm Mn stain
163	WP163 H1	sed with silica spines
164	WP164 D1	glass, ol+ palg, sp. Ø; form ND mod fresh; >20pcs <6cm
164	WP164 D2	basalt ol plag sp. Ø; frm ND mod fresh; 3pcs <5cm Mn stain
164	WP164 D3	basalt ol plag sp. Ø; varied vsclsr, form ND freshish; 10pcs < 4cm Mn stain
164	WP164 D4	basalt ol plag, sp. Ø; lots vscls, form ND fresh; 9pcs <10cm Mn stain
164	WP164 D5	basalt glass, ol plag, sp. Ø; varied vsclr, form ND, fresh %pcs <15cm; Mn stain
164	WP164 B1	corals and shells
164	WP164 B2	forams
165	WP165 D1	consolidated breccia, fine silt matirx with basalt + glass clasts from sand to pebble size.weak bedding poor sorting
165	WP165 H1	sed with bits bio in
165	WP165 B1	sponges, corals, and bryozoans
165	WP165 B2	forams in coarse sediment
166	WP166 D2	basalt a-Ø; lots vscls, form ND altd; 1pcs 15cm
166	WP166 D3	basalt + erratics; assd sub-rounded basalt and other clasts 1-10cm
166	WP166B1	assorted fauna
167	WP167 D1	basalt, ol plag, so. Ø; lots vscls, form ND; 7pcs <5cm
167	WP167 D2	basalt + glass, plag ol, sp. Ø; lots vscls, form ND; 3pcs <3cm
167	Wp167 D3	glass, plag + ol, sp. Ø; few vscls, form ND, mixed fresh/altd; >10pcs <3cm;
167	WP167 D4	basalt + glass, plag ol,sp. Ø; few vscls, sheet form mixed fresh/altd <20cm
167	WP167 D5	basalt, a-Ø; few vscls, form ND; 1pcs 10cm;
167	WP167 B1	assorted fauna
168	WP168 D1	basalt, ol plag, v sp. Ø; lots vscsl, form ND; <10pcs <20cm; Mn stain
168	WP168 D2	basalt, ol plag, v. sp. Ø; lots vascls, form ND; 4pcs <7cm Mn stain
168	WP168 D3	glass; a-Ø; lots vscls, form ND, mixed fresh/altd; 4pcs < 5cm;
168	WP168 H1	usual beige mud + glass
168	WP168 B1	assorted fauna
169	WP169 D1	glass; form ND fresh; >20pcs <3cm;
169	WP169 D2	basalt, ol plag, v.v.sp. Ø; lots vscls, formND, not fresh; 2pcs <4cm; Mn stain
169	WP169 D3	basalt, ol plag, sp.-high Ø; lots vscls, form ND; 20pcs <5cm;
169	WP169 D4	ditto; 20pcs <4cm varied Mn stains

APPENDIX 3 : PETROS SAMPLE LOG

169	WP169 D5	bas. & glass. ol. plag. sp ø -high ø, vesicular, freshish, >20 pieces, <5 cm.
169	WP169 D6	bas. & glass. ol. plag. sp ø, vesicular, fresh, 4 pieces, <10 cm, Mn stained.
169	WP169 D7	bas. & glass. ol. plag. sp ø, few vesicules, pillows, mod. fresh, 1 pieces,40 cm, Mn stained.
169	WP169 D8	bas. & glass. ol. plag. sp ø, vesicular, mod. fresh, 1 pieces,10 cm, Mn stained.
169	WP169 D9	bas. & glass. ol. plag. sp ø, vesicular, mod. fresh, 1 pieces,12 cm, Mn stained.
169	WP169 H1	V coarse (3m) sediment, lots of glass frags. and shell debris.
169	WP169 B1	forams
169	WP169 B2	assorted fauna
170	WP170D1	bas. & glass. ol. plag. sp ø -high ø, few vesicules, mod. fresh, 1 piece,10 cm, Mn stained.
170	WP170D2	bas., ol. & plag. + ø -high ø, lots vesicules, mod. altered, 1 piece,20 cm, Mn stained.
170	WP170D3	bas., plag. + ol. sparsely- ø, few vesicules, mod. altered, >20 piece,5 cm, Mn stained.
170	WP170D4	glass, variabley vesicular, fresh, >20 pieces, 2 cm, no -Mn staining
170	WP170D5	bas., plag. + ol. variably- ø, lots vesicules, fresh, >20 piece,5 cm, no - Mn stained.
170	WP170D6	Bas. plag. + ol. variably- ø, lots vesicules, fresh, >20 piece,5 cm, variably - Mn stained, pillow or sheet flow top.
170	WP170D7	bas. a-ø, lots. vesicles, mod. fresh, 1 piece, 5cm, Mn stained.
170	WP170B1	corals and bivalsves
171	WP170D1	glass, a-ø, few vesicles, freshish, <20, 2 cm, no Mn -stain.
171	WP170H1	silt/sand with sponge debris.
171	WP170B1	corals, sponges, bivalves and a gastropod
172	WP170D1	bas. & glass. ol. plag. v. v. sp ø, lots vesicules, fresh, 18 pieces,3 -5 cm, no Mn stained.
172	WP170D2	glass. ol. plag. v. v. sp ø, lots vesicules, fresh, >20 pieces,<2 cm, no Mn stained.
172	WP170B1	small fish, coral and starfish
173	WP173D1	bas. & glass. ol. plag. sp ø, few vesicules, fresh, 3 pieces, 10 -25 cm,no Mn stain, sheet flow.
173	WP173D1	bas., plag. + ol. sp ø, lots vesicules, fresh, 10 pieces, 1-8 cm, no Mn stain, pillow flow?.
173	WP173D2	bas. & glass. ol. plag. sp ø, few vesicules, fresh, ~20 pieces, 1 -3 cm,no Mn stain.
173	WP173H1	mud silt and sponge debris
173	WP173B1	sponge, bivalves and bryozoan
174	WP174D1	basalt., ol. & plag., v. highly -ø, lots vesicles, mod. fresh pillow lava
174	WP174D2	glass, ol. + plag., highly ø, lots vesicles, variably altered, <10, <10cm, no Mn stain.
174	WP174D3	basalt., ol. & plag. & cpx, highly -ø, lots vesicles, fresh, sheet flow, 2 pieces, <10cm.
174	WP174D4	basalt. and glass, plag. ol. & cpx, highly -ø, lots vesicles, varaibly altered, sheet flow, 5 pieces, <15cm, no Mn stain.
174	WP174D5	glass, plag. ol. & cpx, highly -ø, lots vesicles, varaibly altered, pillow flow, 7 pieces, <20cm, no Mn stain.
174	WP174D6	glass, plag. ol., highly -ø, lots vesicles, varaibly altered, sheet flow, 1 piece, <25cm, no Mn stain.
174	WP174D7	basalt. and glass, plag. ol. & cpx, highly -ø, lots vesicles, freshish, sheet flow, 1 piece, <25cm, no Mn stain.
174	WP174D8	basalt. and glass, plag. ol. & cpx, highly -ø, lots vesicles, freshish, sheet flow, 1 piece, <25cm, no Mn stain.
174	WP174H1	beige mud with sponge spines.
174	WP174D9	basalt. and glass, plag. ol. & cpx, highly -ø, lots vesicles, fresh, pillow flow, 3 pieces, 50cm, Mn stain.
174	WP174B1	soft bodied things
175	WP175D1	basalt. and glass, a -ø, lots vesicles, variably altered, >20 pieces, <3cm, no Mn stain.
175	WP175D2	basalt. and glass, a -ø, lots & lots vesicles, variably altered, pillow flow, 3 pieces, <10cm, slight Mn stain.
175	WP175D3	basalt, a -ø, lots vesicles, variably altered, pillow flow, 7 pieces, <15cm, no Mn stain.
175	WP175D4	basalt. and glass, a -ø, lots vesicles, freshish, pillow flow, 10 pieces, <20cm, slight Mn stain.
175	WP175D5	basalt. and glass,plag., sparsley -ø, lots vesicles, freshish, pillow flow, 10 pieces, <20cm, slight Mn stain.
175	WP175D6	basalt. and glass,a -ø, lots vesicles, fresh, pillow flow, 2 pieces, <30cm, slight Mn stain.
175	WP175D7	basalt. and glass,ol., sparsley -ø, lots vesicles, fresh, pillow flow, 3 pieces, <25cm, slight Mn stain.
175	WP175D8	basalt. and glass,a -ø, lots vesicles, variably altered, pillow flow, 1 piece, <20cm, slight Mn stain.
175	WP175B1	soft pink corals, shrimp, oysters and hard coral
176	WP176D1	glacial erratics
176	WP176D2	basalt. and glass,a -ø, lots vesicles, fresh, 10 pieces, <2cm, no Mn stain.
176	WP176H1	beige sed. and glass
177	WP177D1	basalt. and glass,plag., sparsley -ø, lots and lots vesicles, freshish, >20 pieces, <10cm, no Mn stain.
177	WP177D2	glass, a -ø, lots vesicles, fresh, pillow flow, 10 pieces, <2cm, no Mn stain.
177	WP177D3	basalt. and glass, ol. + plag., sparsley -ø, few vesicles, fresh, 2 pieces, <5cm, no Mn stain.
177	WP177D4	basalt., plag., very -ø, few vesicles, altered, 1 piece, 2cm, Mn stain.
177	WP177D5	erratics
177	WP177D6	basalt. and glass, a -ø, lots vesicles, altered, 1 piece, <4cm, Mn stain.
177	WP177H1	fine - med. grained sed.
177	WP177H2	consolidated fine -med grained sed.
177	WP177B1	shells and coral
177	WP177B2	foams
178	WP178D1	basalt. and glass, plag., highly -ø, lots vesicles, altered, 2 pieces, ~4cm, no Mn stain.
178	WP178D2	basalt., a -ø, lots vesicles, altered, 10 pieces, <5cm, no Mn stain.
178	WP178D3	assorted small basalt frags, >10 pieces, 1.5cm, no Mn stain.
178	WP178H1	brown silty mud
178	WP178B1	large sponge (8 x 10cm) plus others, corals, algea, and starfish
179	WP179D1	basalt. and glass, a -ø, few vesicles, very fresh, 3 pieces, <8cm, no Mn stain.
179	WP179D2	glass, a-ø, few vesicles, fresh, <10cm, no Mn stain.
179	WP179D3	basalt. and glass, a -ø, lots vesicles, freshish, pillow lava, 15 pieces, <15cm, no Mn stain.
179	WP179D4	basalt. and glass, ol., sparsley -ø, lots vesicles, freshish, pillow lava, 2 pieces, <10cm, no Mn stain.
179	WP179D5	basalt. and glass, a -ø, lots vesicles, freshish, sheet lava, 1 piece, 25cm, no Mn stain.
179	WP179H1	beige mud with sponge spicules
179	WP179B1	small gastropods, bivalves, coral, and soft coral
180	WP180D1	erratics
180	WP180D2	glsaa, a-ø, sheet flow, no vesicles, fresh, 1 piece, <20cm, no Mn stain.
180	WP180D3	glass attached to coral, no vesicles, fresh, 1 piece, <1cm, no Mn stain
181	WP181D1	dolerite, ol, sparsley -ø, few vesicls, <20 pieces, 4 -20cm, some Mn staining.
181	WP181D2	dolerite, a -ø, lots vesicls, mod. fresh, 3 pieces, <20cm, Mn staining.
181	WP181D3	bas. and glass, a -ø, variable -lots vesicles, freshish, 1 piece, 6 cm, Mn staining
181	WP181D4	basalt, a -ø, variable vesicles, freshish, 2, 6cm, Mn Staining

APPENDIX 3 : PETROS SAMPLE LOG

181	WP181D5	dolerite, a-ø, lots vesicles, freshish, 1 piece, 8 cm, no Mn staining.
181	WP181H1	Coarse sand with mud and dark brown fresh glass shards
181	WP181B1	green sponges, corals, and other fauna
182	WP182D1	glass and basalt, a -ø, few vesicles, altered, <20 pieces, 2-15cm, Mn stained
182	WP182D2	volcanogenic s.st., -ø, sediment, fresh, <4cm, no Mn staining.
182	WP182D3	basalt nad glass, ol., sparsley ø, few vesicles, freshish, 8 pieces, 3 -15cm, Mn stained.
182	WP182D4	erratics, 3, <5cm
182	WP182H1	med -coarse sand and brown mud + shell debris
182	WP182B1	corals, sponges and algea
183	WP183D1	basalt, pl. ol., highly - ø, lots vesicles, fresh, 14 pieces, 5 -20cm, no Mn staining
183	WP183D2	glass and basalt, pl ol., highly - ø, sheet flow, fresh, >20 pieces, 1 -20cm, no Mn staining.
183	WP183D3	basalt, -ø, no vesicles, variably altered, 1 piece, 5cm, Mn stained.
183	WP183B1	bivalves, wood -louse creature, corals, sponges.
183	WP183B2	fan -shaped coral
184	WP184D1	basalt and erratics, 10 pieces, <5cm, rounded no Mn staining.
184	WP184D2	erratics
184	WP184B1	sea slug, 10 x 3cm with legs
185	WP185D1	glass and basalt, ol., sparsley ø, lots and lots of vesicles, variable altered, 1 piece, no Mn stain
185	WP185D2	glass and basalt, ol. + plag., sparsley ø, lots and lots of vesicles, variable altered, 1 piece, no Mn stain
185	WP185D3	glass and basalt, a ø, lots of vesicles, variable altered, 2 pieces, 15cm, no Mn stain
185	WP185D4	glass and basalt, ol. + plag., sparsley ø, lots of vesicles,pillow lava, variable altered, 4 pieces, <20cm, no Mn stain
185	WP185D5	basalt, a-ø, lots vesicles, pillow lava, 1 piece, 50 cm, no Mn staining.
185	WP185B1	assorted corals, bivalves and sponges
186	WP186D1	erratics
186	WP186D2	basalt, ol. ø, sparsley ø, few vesicles, 1 piece, <30cm, no Mn staining.
186	WP186H1	brown sandy sed + forams
186	WP186B1	brachiopods and corals