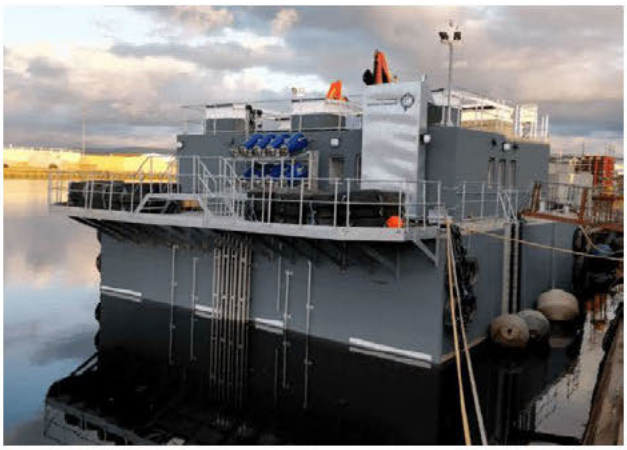

# BARGE SALVAGE – PORTREE- OIL, GAS AND FEED DISCHARGE AND REMOVAL METHOD STATEMENT

BMC Ref: DV0240-4007 – Rev 2.0 07 08.2022


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**CONTENTS**



**Amendment Register**

| Revision | Date | Issued by | Approved by | Amendments |
|---|---|---|---|---|
| 1.0 | 03.08.2022 | [redacted] | | |
| 2.0 | 15.08.2022 | | | Nitrogen dilution addition |

**Supporting Documentation**

| | |
|---|---|
| **Document Ref** | • BMC Diving Operations Manual<br>• HSEMP Manual<br>• DV0240–4002 Barge Salvage – Portree ROV method statement<br>• DV0240-4003 Barge Salvage – Portree Diving ops method statement<br>• DV0240-4005 Barge Salvage – Portree Escape Plan<br>• DV0240- 4006 Barge Salvage – Portree General FRC Operations Method statement<br>• DV0240-4007 Barge Salvage – Portree Oil, Gas and Feed Discharge and Removal me hod statement<br>• DV0240-4008 Barge salvage - Portree Rescue Party Me hod Statement |
| **Assessments** | • DV0240-3001 Barge Salvage – Portree General Diving RA<br>• DV0240-3010 Barge Salvage – Portree General ROV ops RA<br>• DV0240-3007 Barge Salvage – Portree Covid-19 RA<br>• DV0240-3015 Barge Salvage – Portree Hydraulic/vibration tools RA<br>• DV0240-3003 Barge Salvage – Portree Underwater welding/Burning RA<br>• DV0240-3002 Barge Salvage – Portree Lift bag use RA<br>• DV0240-3004 Barge salvage – General FRC opera ions RA<br>• DV0240-3020 Barge Salvage – Portree $H_2S$ RA |
| **Permits** | • BMC permit to work |
| **Lifting Plans** | • Forth Drummer Knuckle boom crane - Planned lifts |
| **Drawings** | N/A |

Commented [SW1]: will need a lifting plan for this. Please ask [redacted] to arrange through the external contractor or has this already been done?

Commented [CH2R1]: [redacted] please could you assist with this?

**Abbreviations**

| Abbreviation | Definition |
|---|---|
| BMC | Briggs Marine Contractors Limited |
| CTV | Crew Transfer Vessel |
| $CH_4$ | Methane (gases) |
| DS | Dive supervisor |
| DSV | Dive Support Vessel |
| H2S | Hydrogen Sulfide (gases) |
| IBC | Intermediate Bulk Container |
| MV FD | MV Forth Drummer |
| MV FJ | MV Forth Jouster |
| VTS | Vessel Traffic service |
| NOK | Next of Kin |
| PAX | Passengers |
| PID | Photoionization device |
| PLB | Personal Locator Beacon |
| POB | Persons on board |
| PM | Project Manager |
| PPE | Personal Protective Equipment |
| SMB | Surface Marker Buoy |
| SOLAS | Safety of Life at Sea |

# 1. INTRODUCTION

## 1.1. Background

The Seamate 450 fish feed barge supplying pellet food to the salmon farm in Portree Harbour, Isle of Skye sank during Storm Arwen in Q4 2021 with approximately 400t of feed on board. Briggs Marine Contractors (BMC) responded to a request from Scottish Salmon Company (SSC) shortly thereafter to secure the feed silos, of which there are six, with temporary hatch covers to control and prevent the emission of feed oils that are part of the feed pellets from being emitted to the environment.

In May 2022 BMC was awarded the contract to recover the barge. An ROV survey was conducted in June 2022 to aid the preparation of the salvage plan. Preliminary diving work started on site July 2022 with the aim of preparing the barge for recovery August 2022. During these works it was noticed that gas bubbles were

escaping from the temporary hatch covers and from previously unidentified cracks in the concrete wall of the accommodation block on the starboard stern. These gas bubbles had not been identified during the ROV survey or during the early preparatory works.

Hoses, pumps, and two IBCs were supplied to allow the relief of the unknown pressure within the silos as there was concern over the possibility of an uncontrolled release of the pent up gases and oils or structural harm to the barge as cracks were identified by the emission of the gases. During the relief of the gas and oils from the silos it became apparent that the gases were toxic in composition with Hydrogen Sulphide ($H^2S$) and Methane ($CH^4$) detected by the onsite Draeger X-am 2500 4 gas. At the mouth of the IBC where the oil was being collected on the deck of the Dive Support Vessel (DSV) MV Forth Drummer concentrations of H2S were detected at 154ppm and away from the IBC on the back deck of Forth Drummer in concentrations between 30 and 80 ppm.

During diving operations, a gas sample was collected directly from the sunken barge itself, and analysed by a Marine Chemist which provided the results of the presence of $H_2S$ in concentrations of 55,000 ppm which puts the gas into explosive range but only when oxygen is introduced as levels in the silos for o2 are very low at 2.4% volume.

Actual readings from silo test below -

| | |
|---|---|
| O2 | :2,4 %vol |
| CO | :1580 PPM |
| H2S | :5,5 % vol (55000 PPM) |
| LEL | : 100 % (not accurate O2 <8 % vol) |
| VOC | : 231 PPM (PID) |

Please note the lower explosion limit of H2S is 4,3 % vol

## 1.2. Purpose and Scope

The purpose of this methodology document is to provide a clearly defined process for the removal of any further oils and gas within the silos of the barge followed by the removal of the feed from the silos prior to the resumption of the preparatory works for recovery in order to mitigate the risk of the release of the oils and further production of the gases from the decomposition of the feed and oils contained within the silos of the sunken barge thus significantly reducing the risk to the personnel involved in the fish farm operations, BMCs personnel and contractors involved all stages of the recovery, and the local population and tourists to the area of Portree. This document is provided primarily for use by the responsible persons noted below and as a reference document for BMC site Dive supervisor, BMC Forth Drummer crew and The Scottish Salmon Company

## 1.3 Roles and Responsibilities

The site Dive supervisor has the authority to supervise the Dive team and operations in accordance with BMC procedures, legislation, ACOP and guidance.

• To ensure to the best of his ability that the expectations defined in the BMC procedures, legislation, ACOP are met.

• Responsible for safety of all personnel at the work site

• To confirm that all personnel have sufficient training and competence to carry out works

• To confirm all equipment is certified against industry standards

• To confirm that risk assessments relevant to work scopes have been completed

• Responsible for efficient operations of the project and to ensure all personnel employed to carry out works are competent to do so and work in accordance with BRIGGS rules

• Ensures that BRIGGS company responsibilities are fully met

• Reports to onshore Operations Manager.

• To work in accordance with the BRIGGS rules and SMS

• Ensure that equipment maintenance activities are carried out in accordance with industry standards.

Commented [SW3]: all staff onsite to complete the H2S training. Bump testing and escape hoods to be provided to all

• Must initiate Emergency Response if an incident/medical emergency takes place at site

The BMC Team have the duty to maintain general safety as directed by the client and BMC site Dive supervisor and detailed in the Operations Manual. Abnormal situations should be cascaded to relevant interested parties.

## 2. Methods

### 2.1. Task list

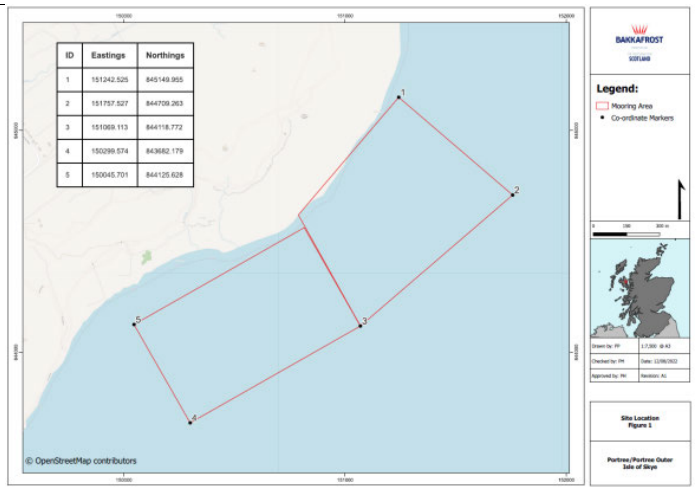
- Oil/Gas removal and site gas monitoring

## Oil and Gas removal

The following steps describe the procedure for venting and removing the oil from the silos subsea and the monitoring of gases around the casualty area

| Method of Work | | |
|---|---|---|
| **Item** | **Task** | **Persons responsible** |
| | NO SMOKING ALLOWED! | |
|  | **Note: Project team and Vessel Master assess weather conditions and sea state are within parameters to carry out tasks.**<br>Maximum operational limits:<br>Water current: 0.8 knots<br>Surface visibility: ≤1km<br>Lightning Risk: Lightning forecast within 4hrs<br>Wind speed: 20 knots<br>Significant wave height: 1m | |
| | **Notice to mariner's exclusion zone for operation** | |

Commented [SW4]: need weather limits putting into the document




Area gas monitors to be positioned at below locations for continuous readings of H2s to the North, East, South and West from casualty location.


Readings can be remotely monitored 24hrs a day so in the event of a large release early warning can be achieved

Marine Chemist

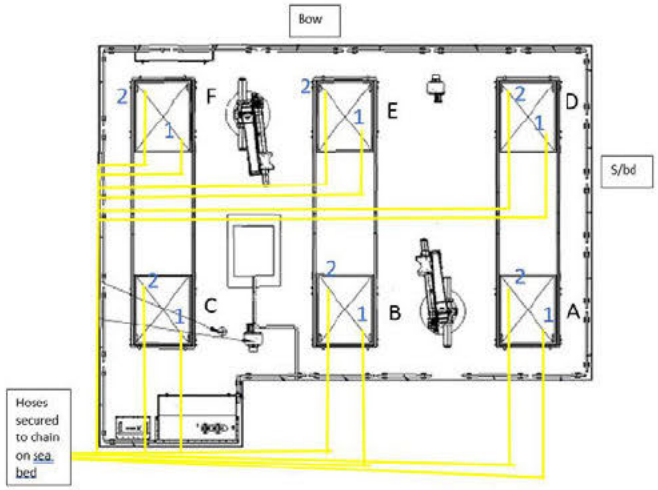
Tenders

| | | |
|---|---|---|
| **1.** TOOL BOX TALK | Dive supervisor holds TBT with team.<br>Reviews risk assessments and emergency procedures<br>Dive Supervisor obtain permit to work from vessel and harbour authority | Dive supervisor and Duty officer |
| **1.** | Dive supervisor holds toolbox talk – ensuring that all personnel are aware of the escape plan, safe use of the escape set and familiarisation with the risks at hand, including irritation of skin at wrists and neck if H2S concentrated in water | DS |
| **2.** | Personal gas monitors to be bump tested and recorded daily<br>Static monitors to be checked for functionality during all plant checks<br>BA sets to be checked over for readiness, charged if necessary and placed into locations for immediate access by the dive team. | All crew |
| **3.** SAFETY CRITICAL | Only personnel immediately needed to perform the task are to be present on deck e.g. Crane operator, slinger banksman<br>Escape sets to be worn by all personnel on the vessels – ready for use!<br>NO SMOKING ALLOWED! | All Crew |
| 4. | Gas monitor readings to be obtained in all areas<br>$CH_4$ =<br>$O_2$ =<br>$C_0$ =<br>$H_2S$ = | All crew |
| 5. | Dive team to set up the dive spread and plant for the scheduled tasks ahead | Dive team |
| 6. | Nitrogen spread to be set-up on the working barge with sufficient length of hoses and connections to reach and connect to the valves on the silos on the sunken barge. | DS<br>Dive team |
| **7.** | DS and Vessel Master confirm vessel and working barge are in suitable positions for diving<br>• Working Barge to be within the 4-point mooring grid<br>• MV Forth Drummer to be attached to the 4-point mooring grid, but on the outside, on 2-points of mooring just, up wind from the venting gases | DS<br>Vessel Master |
| **8.** | Function test equipment, Standby and diver cross checks complete. | Dive team |
| **9.** | Dive team and deck crew ensure all hoses and tools are ready to be lowered to the diver down the job line using a messenger line | Dive team<br>Deck Crew |

Commented [SW5]: can you title the TBT and attached it to this document?

Commented [CH6R5]: Will create a TBT specific to this and add into documentation

Commented [SW7]: and recorded in the sheet

| | | |
|---|---|---|
| **10.** | Diver enters the water via the dive ladder | Diver<br>Tender |
| **11.** | Diver places hat and hoses under the surface to check for leaks, Topside tenders to confirm to DS that there are / are not leaks. | Diver<br>Tenders<br>DS |
| **12.** | When satisfied there are no leaks DS instructs diver to leave surface.<br>(In the event of leaks dive is aborted and diver recovered to deck to check leaks and repair) | DS<br>Diver<br>Tenders |
| **13.** | Diver makes way down the job line taking the first length of hose from Nitrogen spread<br>Topside paying out the hose as diver descends | DS<br>Diver<br>Deck crew |
| **14.** | Diver takes hose to first location as listed in the table below<br>  | Diver |
| **15.**<br>SAFETY NOTE | Prior to connecting the crows' feet fittings, diver is to make sure umbilical is clear | Diver |
| 16. | Diver connects fittings in order of the table, confirms with DS before securing with R-clip and whip checks | Diver<br>DS |

Commented [SW8]: on deck escape hoods and portable gas monitors to be worn at all times

Commented [CH9R8]: already stated in item 3

| | | |
|---|---|---|
| 17. | Diver connects remaining Nitrogen hoses in sequence and confirms each are securely connected. | Diver<br>DS |
| 18. | Diver now connects each of the venting hoses in a similar manner as per the diagram above, Point 14, ensuring each hose is securely fastened | Diver<br>DS |
| 19. | Diver uses zip ties to secure the hose running along to the Aft Portside quarter railings ensuring the hoses will be clear of lifting ops to take place | Diver<br>DS |
| 20. | Diver requests next hose is sent down the job line on the weighted messenger | Diver<br>DS<br>Topside |
| 21. | Diver recovers hose and instructs topside to recover messenger | Diver<br>DS<br>Topside |
| 22. | Diver installs hose on next position.<br>Repeat steps 13 – 19 until all hoses are in place. | Diver |
| 23. | Diver to secure all hoses to each other at the Aft Portside quarter and then secure to the Chain on the seabed that runs towards the pens from the Port side of the vessel | Diver |
| 24. | Diver will secure an SMB to themselves and make way along the chain securing the hoses to the chain on the bed. | Diver |
| 25. | Once the SMB is at distance safe enough for the MV Forth Drummer to move in and out of moorings the diver make way back to the barge | Diver<br>DS<br>Vessel master |
| 26. | Diver leaves bottom and makes way to the job line for ascent to surface, adhering to ascent rate stipulated by the DS in accordance with tables | Diver<br>DS<br>Tenders |

| | | |
|---|---|---|
| 27. | Diver leaves the water at the splash zone ladders | Diver<br>DS<br>Tenders |
| 28. | Tenders will use PID meter to ensure the PPM levels from the divers clothing are at a safe level prior to making contact with the diver to undress | Tenders |
| 29. | Once the diver is on deck, the FRC will be used to place a weighted 27mm polypropylene line down the SMB a second line is to be secured for recovering the pipes to the surface | FRC skipper<br>Crew |
| 30. | When the FRC is back alongside the next diver can enter the water | DS<br>Diver<br>FRC Skipper<br>Vessel Crew |
| 31. | Diver places hat and hoses under the surface to check for leaks, Topside tenders to confirm to DS that there are/are not leaks. | Diver<br>Tenders<br>DS |
| 32. | When satisfied there are no leaks DS instructs diver to leave surface.<br>(In the event of leaks dive is aborted and diver recovered to deck to check leaks and repair) | DS<br>Diver<br>Tenders |
| 33. | Diver leaves surface and descends along the job line | DS<br>Diver<br>Tenders |
| 34. | Diver makes it to the top of the barge, moves along secured hoses to the seabed and makes way along the chain and hose to the SMB. | Diver<br>Tenders |
| 35. | Diver removes the polypropylene line from the SMB and secures to the chain on the seabed<br>Diver secures hose ends to the recovery line secured to the polypropylene line for recovery to surface | Diver |
| 36. | Diver removes the SMB marker buoy reel from the chain and releases for recovery by the FRC | Diver |

| | | |
|---|---|---|
| 37. | Dependant on bottom time<br>- Diver will make way back to the barge and leave bottom<br>- Diver will leave bottom at the marker buoy just installed<br>Diver leaves bottom and adheres to ascent rate stipulated by the DS in accordance with tables | Diver<br>DS<br>Tenders |
| 38. | Diver leaves the water via the splash zone ladders<br>Tenders will use PID meter to ensure the PPM levels from the divers clothing are at a safe level prior to making contact with the diver to undress | Diver<br>DS<br>Tenders |
| 39. | Once the diver is on deck the FRC can make way to the buoy recover hoses and secure at the surface on the marker buoy<br>If possible, dive team will utilise one of the marker buoys in location | Diver<br>DS<br>Tenders<br>FRC Skipper<br>Crew |
| 40. | Hoses are now installed sub surface ready for connections on the surface | All crew |
| 41. | Hoses recovered with the FRC and run to the 1st of the Northern pens on the inshore side to the manifold for venting, and discharge of oils into the boomed off area in the 3rd pen North inshore side<br>  <br>**Figure 1 Proposed boomed off area (image for reference only)**<br>From the manifold at pen 11 the discharge pipe will continue onto pen 3 for discharge into the boomed off area.<br>The discharge pipe is tethered to the pen using ropes, there will be 4 pellet buoys placed between pens 1 and 2, then 4 pellet buoys placed between 2 and 3. | FRC Skipper<br>Crew |

Commented [SW10]: the discharge pipe how is this holding in position? how many floating buoys in place
Commented [CH11R10]: [redacted]

Commented [SW12]: how are we booming and securing the pipe discharge into the fish pen. need this to be included
Commented [CH13R12]: [redacted]

| | | |
|---|---|---|
| |  | |
| 42. | When all pipes have been connected and confirmed secure dive team will prepare to dive and open the valves on tanks as specified by the dive supervisor and operations supervisor.<br>Gases will be dispersed slowly into the atmosphere – any oils that are recovered in the boomed off area will be recovered using the skimmer and dealt with according to instructions to follow! | All crew |
| 43. | Function test equipment, Standby and diver cross checks complete. | Dive team |
| 44. | Diver enters the water via the splash zone ladders | Diver |
| 45. | Diver places hat and hoses under the surface to check for leaks, Topside tenders to confirm to DS that there are / are not leaks. | DS<br>Diver |
| 46. | When satisfied there are no leaks DS instructs diver to leave surface.<br>(In the event of leaks dive is aborted and diver recovered to deck to check leaks and repair) | DS<br>Diver<br>Tenders |
| 47. | Diver makes way down the job line to the barge, then makes way to tank A | Diver<br>DS |
| 48. | Surface operator to connect N2 hose to Nitrogen generator | Forth Guardsman |
| 49. | start compressor and N2 generator open by pass and allow the N2 generator to settle to 97% purity | Forth Guardsman |
| 50. | With surface manifold valves all closed diver will be instructed to open Valve A on the venting manifold | DS<br>Diver<br>Tenders |

**Commented [SW14]:** what is happening to the oil and gas left in pen 3? how is this collected controlled in a safe manner ?

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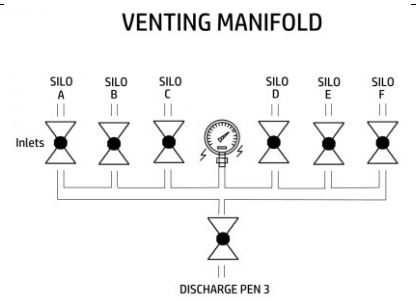
| |  | |
| 51. | Surface operator opens valve A1 on venting Manifold and records pressure reading before opening discharge valve to containment boom in pen 3. | Forth Guardsman |
| 52. | Pressure reading and sample gas to be taken.<br>• Pressure reading =<br>• Sample gas $H_2S$ =<br>Marine Chemist to be on station to provide direction / confirmation | Diver<br>DS<br>Chemist |
| 53. | **Nitrogen to be very slowly, continually trickle fed, into the silos with constant monitoring of the pressure readings, to dilute the $H_2S$ until limit is achieved <20 % lower explosive limit or 8600ppm H2s**<br>Marine Chemist to be on station to provide direction | DS<br>Forth Guardsman<br>Chemist |
| 54. | Diver exits water at splash zone ladders whilst waiting for $H_2S$ dilution | DS<br>Diver |
| 55. | When safe to do so again and on advice from Marine Chemist, DS to re-commence diving ops., Points 1 – 13 to be stepped through for the venting hoses, where applicable. | DS<br>Chemist |
| 56. | The maximum allowed flow rate from each silo during venting, will be advised by marine chemist | Chemist |
| 57. | Once Silo “A” has been discharged of gas / oil all valves on manifold will be closed ready to repeat previous operation on remaining silos hatches, each time recording pressures for each silo. | DS<br>Diver<br>Forth Guardsman |
| 58. | When all silos have been depressurised Diver will be instructed to open all 12 valves so control of the venting can be achieved from surface manifolds and to allow low pressure flushing/de-gassing of silos. | DS<br>Diver |
| 59. | Surface operator will open Valve “A1” on venting manifold and “A2” on purging Manifold. | Forth Guardsman |

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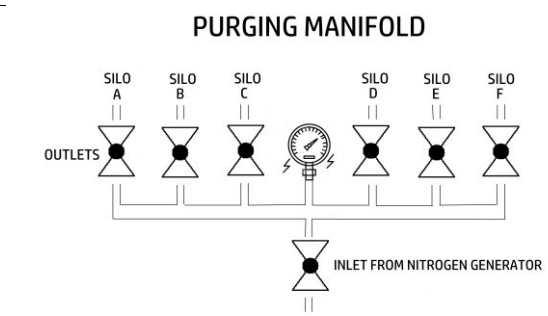
| |  | |
| 60. | Surface operator opens valve to nitrogen generator allowing low pressure inert gas to transverse pipework to the lower valve “A2” which in turn will push any remaining gases and oil up to venting manifold then onwards to pen 3 containment booms. | Forth Guardsman |
| 61. | Once operation on silo “A” LEL is below limits of <20 % LEL or 8600ppm H2s the previous operation 61 will be repeated on remaining silos one by one until all 6 silos are venting to pen 3 | Forth Guardsman |
| 62. | Nitrogen venting to be carried out 24hrs a day to ensure no build-up of noxious gases. | Forth Guardsman |
| 63. | Gases will be monitored on a 24/7 basis by use of monitors situated at discharge pen 3 which will send information back to the marine chemist direct. | Marine Chemist |
| 64. | | |

## 3. BRIEFING RECORD

The following briefing record will be filled out and signed by all personnel to confirm and record that all personnel have received and understood the necessary briefing:

| **Briefing Record** | |
|---|---|
| Method Statement Title & Number | DV0240-4007 Barge salvage – Portree Oil, Gas and Feed Discharge Removal Method statement |
| Revision Number | 2.0 |
| Permit to Work | BMC<br>Harbour Authority |

This record is to certify that the method statement including risk assessment and all other relevant documentation has been briefed to the working party

Briefed by:

| **Name** | **Signature** | **Date** | **Designation** |
|---|---|---|---|
| | | | Dive supervisor |

Before work can commence the working party must sign the record below, confirming that they have received the briefing and they fully understand the method statement including risk assessment and all other relevant documentation:

| **Name** | **Signature** | **Date** | **Designation** |
|---|---|---|---|
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