



Operating Procedure - Harvesting

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1. Introduction

Harvesting operations are routinely conducted on all company grow-out sites and are the final stage of the farming production process and release of the harvested product to the processing facility.

Harvesting has the potential to impact a broad range of areas such as product quality, food safety, animal welfare, health & safety and the environment and shall always be conducted in compliance with specified standards.

2. Aims and Objectives

Aims

The aim of this procedure is to ensure that all harvesting operations are conducted in compliance with the applicable standard and legal requirements.

Objective

- Product quality standard consistently achieved.
- Fish welfare standards maintained.
- Food safety standards maintained.
- Environmental impact managed.
- Health & Safety standards maintained.
- A standardised operating process is followed to increase the likelihood of consistently achieving a good outcome.

3. Scope

This procedure applies to all harvesting conducted as part of company operations.

The designated harvesting sites are:

- Loch Melfort
- Loch Craginish
- Loch Pooltie
- Loch Tay



4. Responsibilities

All members of the company team, contractors and visitors share a responsibility proportionate to their roles for the implementation of this procedure.

Operational responsibilities for tasks shall be assigned by the designated manager or supervisor overseeing the operational stages and associated tasks.

Operations Manager

The Operations Manager is responsible for supporting the farming sites with the resource requirement for the implementation of this procedure and logistics arrangements.

Site Managers

The Site Managers have the responsibility for the implementation of this procedure on the farming sites.



5. Technical Information

The technical information provided in this section is not exhaustive and is aimed to provide information on the key aspects underpinning the implementation of this procedure.

5.1 Compliance Documents

The following documents are associated with this procedure.

Document Title		Issued By
1.	Management Plan – HACCP	Kames
2.	OPR – Flesh Quality Monitoring	Kames
3.	Form – Harvest Advice Sheet	Kames

5.2 Equipment Maintenance

Planned maintenance must be carried out on the following equipment in accordance with the manufacturer's instructions:

Equipment	Maintenance Schedule
Trolley Jacks	Daily
Cranes	Daily/Weekly
Harvest Killing Unit	Weekly
Telehandlers	Daily/Weekly
All maintenance activities must be recorded.	

5.3 Stunning and Bleeding

All fish are humanely stunned by an electric stunner and/or a percussive stunner and bled by an integrated bleeding unit. An assessment of effective stun and bleed must be carried out throughout the slaughter process. An appointed harvest operator must assess all fish for effective stun and bleed and immediately apply a secondary stun and bleed in the event of the primary stun and bleed being ineffective.

Where fish have not been effectively stunned:

- They must be effectively restunned immediately.
- This must be reported without delay to the named person responsible for fish welfare and the stunning/killing operator/s
- Action must be taken immediately to rectify the issue/s as necessary.
- The action taken to rectify the issue must be recorded.

The number of fish which require an additional stun and bleeding after primary stun and bleed must be recorded on the HAS

Any drop in stun efficacy below 96% must be reported to the designated manager responsible for the harvesting operation.



Frequent services must be undertaken of all working parts to ensure efficient operation.

All blood water must be contained within the harvesting equipment and discharged into the harvest bins.

Calculating Stun and Bleed Efficacy
The formula for calculating stun and bleed efficacy is the same. The operator monitoring stun and bleed efficacy on the harvest table must count the number of fish showing signs of ineffective stunning and bleeding. Efficacy % = (number of fish/total harvest number of fish) x 100

Assessing Effective Stun and Bleed
The appointed operator assessing the fish for effective stun and bleed must check all fish after they have passed through the primary stun and bleed unit. 1. No eye movement 2. No Rhythmic opercular movement 3. Only mild short-term involuntary muscular twitches 4. No reaction to tail pinch. 5. Fish turn over and remain upside down 6. No sign of fish attempting to swim If the fish are assessed as not being stunned, the fish must be stunned by a secondary means such as a single blow to the head with a priest or go through the primary stun and bleed system again.

5.4 Training

All members of the harvest team are required to receive fish welfare training and food hygiene training.

In addition to fish welfare training, operators must receive specific training that covers fish welfare in relation to the slaughter process and stunning and bleeding techniques applied during the harvesting process – this is achieved through the in-house training programme, where a senior member of the team with proven competency in the requirements provides the training.

Training records must be kept as evidence of compliance.

Annual Health and Hygiene Training

All members of the harvesting team are required to refresh harvest hygiene training on an annual basis and sign the designated Health and Hygiene Declaration in confirmation of commitment to compliance with requirements.



Form – Induction/Annual Refresher Training Checklist (KFF-QS-FOR-006)

5.5 Dropped Fish

Any fish that fall off the designated harvest unit or are accidentally dropped on the deck/floor of the harvesting area, must be removed from the harvesting area and disposed of in accordance with the mortality disposal procedure.

Dropped fish must not be returned to the harvest batch.



5.6 Feed Withdrawal

The maximum feed withdrawal shall not exceed 54° days (in compliance with the RSPCA Trout Welfare Standard).

The minimum feed withdrawal period prior to harvesting is 48 hours (to ensure that the gut content is empty to allow for hygienic processing).

Where possible, designated harvest pens should be alternated between harvests to allow for a stock recovery period in between harvests and to minimise consecutive stress events.

5.7 Hand Pallet Trucks

Manual and electric pallet trucks are used to move the harvest bins in the designated operating areas.

Manual Hand Pallet Trucks	Refer to the instruction manual and risk assessment for safe use.
Electric Hand Pallet Truck	Refer to the instruction manual and risk assessment for safe use. Model: OA-5100 Manufacturer: Walsted

IRM Considerations

- Designated Site/Vessel is responsible for the implementation of the equipment IRM plan.
- Pallet trucks must be washed with freshwater after use at sea and stored under cover or in a dry location when not in use e.g. shore base shed.



5.8 Harvest Ice Quality

All ice used for harvesting must be produced using potable water. Ice water shall be tested annually, and a copy of the sampling results must be held on site.

Water Quality Standards		
Test Name	Limits	Units
Coliforms	<1	cfu/100ml
E.coli	<1	cfu/100ml
TVC @37C for 48h	<1	cfu/ml
TVC @22C for 68h	<1	cfu/ml
pH	6.5-9.5	N/A



5.9 Optimar Electro Stunner

Working Instruction – Optimar Electro Stunner

Refer to Optimar Electric Killing Unit manual for technical details.

Reference

[Electric Stunner \(optimar.no\)](http://optimar.no)

1. Carry out pre-use checks.
2. Power requirement: 25 amp – 220V single phase.
3. Set killing voltage at 60V.
4. Start conveyor belt.
5. Monitor unit for 2 minutes to ensure that all is working correctly.
6. Put fish 5-10 fish onto the conveyor belt and assess killing efficacy – contact time on convey belt should be 5-10 seconds.
7. If no issues, continue harvesting as planned.
8. On completion of harvesting – carry out shutdown checks and wash unit.
9. Records of maintenance and checks must be recorded. Bearings and other moving parts must be checked daily.



5.10 Harvesting Contingency Plan

This plan sets out the contingency methods to ensure that fish welfare is not adversely affected in the event of the harvesting procedure being interrupted by equipment failure.

This plan will be reviewed and updated as frequently as is required, but as a minimum a review will be conducted on an annual basis.

Risk Assessment and Contingency Actions			
Risk Factor	Controls	Contingency Action	Risk
1.Power cut	- IRM (inspection, repair, maintenance) - Suppliers provide written notice of planned power outages.	- Backup generators. - If a power outage occurs during harvesting, the brail bag must be filled with water and fish that are in the sedation tank are to be transferred into the bag using hand nets. The brail can then be discharged back into the pen that is being harvested from. The seine net used to crowd the fish in the cage must be released so as not to unduly stress the fish whilst waiting for the power to be restored.	Low
2. Crane breakdown	IRM (inspection, repair, maintenance)	- In the event of a crane breakdown any fish crowded must be released whilst repair work/ an alternative crane is made available. If there is no alternative crane available or the crane repair cannot be completed in a timely manner the harvest must be cancelled. - If the crane breaks down with a brail bag full of fish mid air e.g. hydraulic hose bursts. Then the operator has a short window period (approx. 2 minutes) to lower the brail onto a suitable location and the fish can then either be released straight into the pen or hand netted out of the brail bag into the pen.	Low
3. Harvest Unit breakdown	IRM (inspection, repair, maintenance)	In the event of a breakdown with the harvest unit affecting 1 of the 2 units, brailing of fish must not exceed the rate at which 1 unit is able to humanely dispatch the fish so as not to cause unnecessary suffering through fish being on the harvest table for more than 15 seconds. Stock of maintenance parts is kept on site and competent operators in order to repair a unit swiftly. If both units breakdown, the brail bag must be filled with water and fish that are in the sedation tank are to be transferred into the bag using hand nets. The brail can then be discharged back into the pen that is being harvested from. Any crowded fish must be released from the seine net until the harvesting units are functioning.	Low
4. Boat breakdown	Compliance with Workboat Code	- Backup workboat. - Release any crowded fish until the backup boat is ready to go or cancel the harvest.	Low



	IRM (inspection, repair, maintenance)		
5. Brail bag failure	IRM (inspection, repair, maintenance)	- Backup brail bag. - In the event of a brail bag failure, a spare brail bag must be fitted without delay or immediate repair. Any crowded fish must be released from the seine net until the harvesting procedure can continue. If the failure of the brail bag results in fish being released onto the ground, these fish must be humanely dispatched using a priest. Any fish that have fallen onto the ground must not be included in the harvest and be disposed of.	Low



8. Operational Tasks

The following working instructions cover the key operational tasks that may need to be done in support of the live fish movement operation.

8.1 Harvest Bin Preparation

Harvest bins are disinfected by the fish processor before being returned to the company for final preparation prior to harvest. To ensure food safety is not compromised, the proper procedure for transporting bins, lining bins and filling the bins with ice must be followed.

Bin preparation procedure

- Appropriate PPE must be worn by all personnel involved in bin preparation, this must be clean and used only for the purpose of bin preparation/ fish harvesting.
- Upon arrival, a trained member of the team must remove the bins from the truck using the forklift.
- The bins should then be taken into the bin preparation area where they must be opened and the bin lids stored on a clean pallet away from any contaminants.
- The bins must then be visually inspected to ensure that the proper disinfection procedure has been followed by the processor. In the event of a disinfection issue being found, the bin must not be used for the harvest until a proper disinfection of the bin is carried out. Any poorly cleaned and disinfected bins must be reported to site management for follow up with the processing plant.
- If deemed suitable for use, the bin must be lined with a new disposable plastic bin liner. The liner must be positioned and secured appropriately so as to avoid contamination.
- Once lined, the bins must be moved, via the use of the pallet truck, to the ice machine.
- The ice moving equipment (ice shovels and ice rake) must be checked to ensure that they are clean and in good condition. Any dirty or damaged equipment must not be used so as to avoid contaminants or debris entering the harvest bins.
- If the equipment is deemed suitable for use, the bins must then be filled with the appropriate quantity of ice, this depends on the environmental conditions during harvest (air and water temperature) and the number of fish being harvested.
- Once filled with ice, the bin liner must be unsecured from the bin and all parts of the liner placed inside the harvest bin.
- The bin lids must then be securely placed onto the bins. This will ensure that no contaminants will enter the bins before harvest.
- The harvest bins must then be loaded onto the truck using the forklift.
- The truck takes the bins to the appropriate farm, where the farm offloads the bins using a forklift truck.
- The bins are then spaced out in the designated bin preparation area with a full bin of ice in the centre and two empty bins on either side. Any bins that require lining will be lined with a bin liner.
- Using a designated ice shovel the bins are decanted into the empty bins by shovelling the ice until each bin contains a third of ice.
- The bins are closed up and double stacked ready for loading onto the harvest vessel.



8.2 Ice Production Unit Operation

Follow the ice making machine instruction manual and harvest bin preparation procedure for preparing the ice bins.

The Operations Manager will coordinate all ice requirements and harvesting logistics.

- Toolbox Talk.
- Check bins are clean.
- Dynamic risk assessment of work area.
- Forklift Checks.
- Lay out and prep bins as required.
- Open all doors to ice house.
- One person must remain outside of ice house to act as safety watch.
- Fill bins with ice.
- Stack full bins in designated area.
- Park forklift in designated area.
- Close all doors and switch off lights.



8.3 Harvest Hygiene Plan

The harvest hygiene plan links in with the HACCP pre-requisites programme and ensures that all feasible measures are being implemented to reduce the food contamination risk for harvesting and associated operations.

1.	Approved Cleaning and Disinfection Chemicals	Approved chemicals are supplied by DBM Food Hygiene: • Hypofoam • Divosan Sanisigma
2.	Working Instruction	Harvest Cleaning and Disinfection <u>Schedule</u> • Ice Production Unit – Weekly • Harvest equipment – Every harvest. • Harvest bins – Every harvest.
3.	Monitoring	The efficacy of the hygiene plan is monitored by a programme of visual inspections and swabbing samples. See HACCP for details on pathogenic bacteria. • Visual inspections – every harvest • Swabbing samples – frequency determined by risk/incidents Micros swabbing tests: sterile sampling sponge and enviro stick kit – see swabbing pack for instructions. • Percussive stunners. • Table – electro stunner, holding unit. • Inspection table. • Priests and knives. • Operator standing positions side of table. • Ice Production Unit and equipment.
4.	Record Keeping	Each unit involved in the harvesting process is responsible for keeping cleaning and disinfection records related to their activities.

8.3.1 Harvesting Equipment and Systems

Working Instruction – Harvest Cleaning and Disinfection					
Items to be cleaned/ Area					
Harvesting Vessel and Equipment					
Cleaned by		Hygiene Monitoring / Risk Assessment		Schedule	
Dismantled / Re-	N/A	Hygiene Standard	Procedure Training	Frequency	Every Harvest
Cleaned by:	Operator	Visually /surface swabs if concerned	Yes		
Audited by:	Quality Control		Risk Assessed		
Inspected by:	Site Manager / Skipper		Yes	Duration	Up to 30 minutes
Cleaning Equipment /Materials					
 PressureBrush					
Personal Protective Equipment					
  Safety GlovesSafety FootwearSafety VisorApronCaptive-Clothing					
Chemicals					
Description	Use Rate	Temperature	Symbol	Hazard	
Hypofoam	3-5%	Ambient			
Divosan Sanisigma	1%	Ambient			
Special Instructions / Precautions					
1. Do not mix Acidic chemicals with Alkaline chemicals 2. Do not mix Acidic chemicals with Chlorinated chemicals 3. Safety equipment should be worn at all times 4. Avoid contact with eyes/mouth 5. Switch off and isolate power supply					



Cleaning Instruction
1. Remove all gross debris and place in a suitable waste container. 2. Switch electro stunner off, cover up all electrics and control panels. 3. Rinse everything with fresh clean water to remove chemical residue. 4. Apply an even coverage of Hypofoam solution. 5. Allow a minimum contact time of 20 minutes. 6. Scrub any stubborn areas using a designated brush paying particular attention frame, externals, attachments, undersides. 7. Rinse all surfaces thoroughly with fresh clean water to remove any chemical residue. 8. Visually inspect to ensure all debris has been removed. 9. Re-clean if required. 10. Squeegee excess water to drain with a clean designated squeegee. 11. Spray Divosan Sanisigma solution to all areas. 12. Allow a minimum contact time of 20 minutes. 13. Rinse with fresh clean water to remove chemical residue. 14. Record activity on designated register.
Key Inspection Points
• Externals • Attachments • Undersides

Pictures



1. Overview – please take care to cover all electrics



2. Side view



3. Hopper and feet



4. Internals of hopper



5. Optimar Stunning Unit

8.3.1 Ice Production Unit

Item to be cleaned/ Area					
Ice production unit and equipment.					
Cleaned by		Hygiene Monitoring / Risk Assessment		Schedule	
Dismantled / Re-	N/A	Hygiene Standard	Procedure Training	Frequency	Weekly
Cleaned by:	Operator	Visually /surface swabs if concerned	Yes		
Audited by:	Quality Control		Risk Assessed		
Inspected by:	Site Manager		Yes	Duration	Up to 30 minutes
Cleaning Equipment /Materials					
   Pressure Brush					
Personal Protective Equipment					
     Safety Gloves Safety Footwear Safety Visor Apron Captive Clothing					
Chemicals					
Description	Use Rate	Temperature	Symbol	Hazard	
Hypofoam	3-5%	Ambient			
Divosan Sanisigma	1%	Ambient			
Special Instructions / Precautions					
6. Do not mix Acidic chemicals with Alkaline chemicals 7. Do not mix Acidic chemicals with Chlorinated chemicals 8. Safety equipment should be worn at all times 9. Avoid contact with eyes/mouth 10. Switch off and isolate power supply					



Cleaning Instruction

1. Remove all gross debris and place in a suitable waste container.
2. Cover up all electrics and control panels.
3. Rinse everything with fresh clean water to remove chemical residue.
4. Apply an even coverage of Hypofoam solution.
5. Allow a minimum contact time of 20 minutes.
6. Scrub any stubborn areas using a designated brush paying particular attention frame, externals, attachments, undersides,
7. Rinse all surfaces thoroughly with fresh clean water to remove any chemical residue.
8. Visually inspect to ensure all debris has been removed.
9. Re-clean if required.
10. Squeegee excess water to drain with a clean designated squeegee.
11. Spray Divosan Sanisigma solution to all areas.
12. Allow a minimum contact time of 20 minutes.
13. Rinse with fresh clean water to remove chemical residue.
14. Record cleaning activity on designated form.

Key Inspection Points

- Externals
- Attachments
- Undersides
- Shovels



9. Operating Process

This section provides a framework consisting of a process, procedure and instructions for conducting operations and associated tasks with the objective of achieving a specified outcome.

Caution	Prevent the likelihood of musculoskeletal injuries by, where reasonably practicable, minimising manual handling and using mechanical aids for repetitive tasks and heavy loads.
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Step	Procedure	Responsible Person
1.	<u>Operational Planning and Risk Management</u> The operation shall be appropriately planned before commencing. Harvesting is a continuous operation that requires ongoing resource allocation – all required equipment, vessels and staff are available to conduct the harvest at the designated site.	Operations Manager
2.	<u>Product Release Check</u> Sales Manager in collaboration with the Site Manager must select the required harvest pen, ensuring that: • Fish meet the product specification. • Customer approval is in place. • Organoleptic assessment completed • Fish are out with medicine withdrawal period. • Feed withdrawal for >48 hrs pre-harvest. Product release check completed is recorded on the HAS	Site Manager
3.	<u>Briefing</u> The Harvest Supervisor must conduct a briefing with the harvest team.	Harvest Supervisor
4.	<u>Daily Harvest Plan</u> Sales Manager emails the Site Team with the required harvest volume. Harvest bin preparation – harvest bins are prepared on-site/vessel in accordance with the Working Instruction	Harvest Supervisor
5.	<u>Harvest Preparation</u> • Designated pen is prepared for harvesting • Vessel loadout • Equipment checks	Harvest Team



6.	<u>Harvesting In-Progress</u> 1. Skipper positions vessel alongside pen. 2. Harvest station is disinfected with Divosan and pre-use inspection carried out. 3. Seine net or buoyed line is deployed. - If passive grading to harvest, the panel grader should be deployed approximately 1-2 hours before the planned harvest start time and lifted into the crowding position once the harvest vessel is ready to start. 4. Put oxygen into crowd. 5. Put handy polaris into crowd and monitor oxygen throughout harvest – min 7 mg/l and levels must be recorded at 15-minute intervals. 6. Fish are crowded – maximum 2 hours. 7. Fish should be brailed at an appropriate speed, that ensures fish in the system are out of water for less than 15 seconds. 8. Harvest bin is filled with required fish – maximum 480kg. Consecutive bins are filled. 9. Before changing the harvest bin, close the inspection table valve. Position new bin and open the valve. 10. Once total required fish have been harvested the seine net or buoyed line is removed. 11. Harvest bins are offloaded at shore base. 12. Harvest bins are loaded onto the truck. <u>Fish Welfare</u> An appointed operator must assess all fish for effective stun and bleed. An appointed operator must monitor the crowd. During the slaughter/killing process, if poor welfare for whatever reason is suspected, then: a) The slaughter/killing process must be stopped immediately. b) The issue/s must be rectified prior to re-starting the slaughter/killing process. The harvest supervisor must ensure that a record is kept that includes the following information: • The issue/s • Number of fish affected • Action taken to rectify the issue/s • The date of the event • The time of the event • The name of the person responsible for overseeing the issue.	Harvest Team
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7.	<u>Post Harvesting</u> Harvest inspection, maintenance, repairs, cleaning and disinfection of vessel/equipment. Records maintained by the skipper.	Harvest Supervisor
8.	<u>Post Harvesting Administration</u> Harvest Advice Sheet (HAS) must be completed and emailed to the following people: - Processing facility - Sales Manager/Administrator - Operations Manager - Finance Director - Accounts Manager The completed HAS must be filed in the designated management folder on the company server in the following format: Date/Site/HAS Number e.g. 2024-08-22 CN HAS001 After the fish have been processed, the processing facility emails harvest processing details to the site team providing the following information: - Total number of fish harvested and graded into superior/ordinary/discard. - Downgrades summary The required information for record purposes must be recorded on Fish Talk and in the site management folder.	Harvest Supervisor