Beinn Reithe Production and Technical Statement

July 2021

Document Control Box

Doc number	Version	Date	Author	Reviewed By	Approved By
0006	V01	29-7-21	[redacted]	[redacted]	[redacted]

Contents

1. Executive Summary

This document sets out the farm management plan and processes with regard to production and treatment of salmon planned for the Beinn Reithe site in Loch Long as well as a list of chemicals that may be used on site. This document has been submitted to SEPA as part of the CAR licence application for the Beinn Reithe site, Scotland's first salmon farm to use semi-closed containment systems.

2. Fish Production Plan

2.1. Farming Models

The Beinn Reithe site will adopt one of two farming strategies at any one time:

- ***Post-smolt* production model**; growing salmon from approximately 90g smolt to approximately 1kg, after which they will be transferred off site to be grown-out elsewhere, or,
- ***Harvest* production model**; growing fish from smolt through to harvest size

2.2. Post-Smolt Production Model

2.2.1. Post-Smolt Production

- Smolt are introduced to each of four enclosures at the start of a new farming cycle, this process may take several weeks.
- Smolt are grown from ~90g up to ~1kg *post-smolt* over five to eight months.
- Maximum biomass is reached only at the end of this cycle after which the *post-smolt* are transferred off site from each enclosure.
- Following the *post-smolt* cycle, the farm experiences a fallow period of not less than 2-weeks. In every 2-year period there will be one extended fallow of not less than 4 weeks.
- The site will undertake three of these short cycles over a conventional 24 month farming cycle with a combined minimum fallow period of 8 weeks.
- See *210729-BNRT-Biological models* for anticipated month by month biomass

2.2.2. Feeding

- Each five to eight month *post-smolt* cycle will receive approximately 3,500T of feed.
- The feed will be fed from the surface, intermittently throughout the day.
- The expected biological feed conversion ratio is 1.09.
- Underwater cameras will monitor feeding rate.

- Oxygen will be supplemented to reduce stress, enhance fish welfare and improve FCR.
- Semi-closed systems allow uneaten feed and faeces to be captured and removed from the site.
- Content of feed as per the table below.

Diet	Calculated content per Tonne of feed (%)		
	Carbon	Nitrogen	Phosphorous
>50g	45.35	7.52	1.40
>150g	45.2	7.04	1.40
>500g	49.15	6.88	1.20
>1,000g	49.2	6.24	1.00

2.3. Harvest Model

2.3.1. Production

- Enclosures are stocked in sequence over a period of several months. Each individual enclosure is stocked over a period of days.
- Smolt are grown from 90g to harvest weight over a 22 month period.
- Maximum biomass across the farm is reached at approximately 11 months after which the harvesting of fish begins.
- A percentage of fish are harvested from the farm over a 12 to 13-month period. During this period the farm is at maximum biomass for approximately six months.
- On completion of the final batch of fish being harvested the site will undertake a fallow period for a period of four to eight weeks.
- See *210729-BNRT-Biological models* for anticipated month by month biomass

2.3.2. Feeding

- Over a 22 to 23 months cycle the stock receive approximately 7,300T of feed.
- The feed will be fed from the surface, intermittently throughout the day.
- The expected biological feed conversion ratio is 1.15.
- Underwater cameras will monitor feeding rate.
- Oxygen will be supplemented to reduce stress, enhance fish welfare and improve FCR.
- Semi-closed systems allow uneaten feed and faeces to be captured and removed from the site.
- Content of feed as per the table below.

Diet	Calculated content per Tonne of feed (%)		
	Carbon	Nitrogen	Phosphorus
>50g	45.35	7.52	1.40
>150g	45.2	7.04	1.40
>500g	49.15	6.88	1.20
>1,000g	49.2	6.24	1.00
>2,000g	49.2	6.24	0.90

3. Sea Lice Medicine Elimination Statement

Loch Long Salmon will only be using semi-closed systems at the Beinn Reithe site. This technology has been developed to prevent sea lice from entering the farmed environment by providing a physical barrier around each farming enclosure and pumping water through the enclosure that is taken from deep in the loch. The intakes will be situated below the surface zone where the infective planktonic sea lice life stages live.

Semi closed systems have proven to be extremely effective in Norway where the technology has been deployed for a number of years.

Loch Long Salmon will not be applying for in-feed or bath chemicals to treat sea lice.

4. Other Chemicals and Method Statement

Loch Long Salmon intent to operate the Beinn Riethe site such that the minimum of chemical use is required across all operations.

The following categories of chemicals will be required during the operation of the farm:

- Anaesthetics
- Cleaning and disinfection
- Anti-corrosion coatings

Additionally, the following categories of chemicals may be required for occasional use and/or depending on the farming strategies that are selected:

- Hydrogen peroxide for gill treatments and as a possible sea lice control measure alternative (as required by Marine Scotland Fish Health Inspectorate)
- Antibiotics
- Net/equipment anti-fouling coatings

See Appendix 1 for a full list of chemicals which may be used.

4.1. Fish Anaesthetics

- Anaesthetics will be used when undertaking fish health or weight assessments or other fish husbandry procedures
- The most appropriate anaesthetic will be used for the specific task being undertaken
- Only trained staff will mix and administer the anaesthetics using manufacturer instructions and following company procedures that have been developed with input from appropriate fish health experts.
- Anaesthetics will be stored, handled and disposed of in accordance with the Material Safety Data Sheet (MSDS).

4.2. Cleaning and Disinfectants

- Cleaning and disinfectant products will be used as per manufacturer's instructions
- Where possible equipment will be cleaned and disinfected on shore
- Use of these products will be minimized by using spray applicators when appropriate
- Staff will follow the process and procedures in the company cleaning and disinfection protocol that will be published prior to operations commencing and updated from time to time.
- Cleaning and disinfectant products will be stored, handled and disposed of in accordance with the Material Safety Data Sheet (MSDS).

4.3. Anti-Corrosion

- The floating collar will be treated with an anti-corrosion paint. This paint is long lasting but may need reapplied if and when repairs are carried out.
- Anti-corrosion paints will be stored, handled and applied in accordance with the manufacturer's instructions and the material safety data sheet.

4.4. Antibiotics

- Antibiotics would be used for treating bacterial infection and only on veterinary prescription.
- Antibiotics will be supplied as a medicated feed prepared by one of the Feed Mills in accordance with a veterinary written direction (VWD).

- The medicated feed will be fed to the fish in accordance with the VWD.
- Medicine use will be accurately recorded and kept on file.
- Safety precautions recommended by the manufacturers will be taken.

4.5. Net, Bag & Equipment antifouling

- Chemicals listed are alternatives
- Nets and bags may be treated off-site
- Equipment such as inlet and outlet pipes will be treated *in situ*.

4.6. Other

- Loch Long Salmon may use Hydrogen Peroxide as a treatment to improve gill health. Hydrogen peroxide treatment methods include both treatment using a wellboat or treatment *in-situ* treatment in the semi-closed containment enclosures.

Appendix 1 – list of chemicals to be used on site.

Anaesthetics

Trade Name	Benzocaine
Supplier/Manufacturer	Alpharma Animal Health
Active incredient	Ethyl-4 aminobenzoate
MSDS sheet	Supplied
Maximum Storage	50 litres 1-2 times per year, as required
Storage	Site chemical store
Comments	10% benzocaine stock solution is made up by dissolving 100g benzocaine powder in 1 litre of acetone

Trade Name	Acetone
Supplier/Manufacturer	
MSDS sheet	Supplied
Maximum Storage	As required to dilute Benzocaine (above)
Storage	Site chemical store

Trade Name	Tricaine Pharmaq l00MG/G
Supplier/Manufacturer	Pharmaq
Active incredient	Tricaine methane sulphonate
MSDS sheet	Supplied
Maximum Storage	200g per month
Storage	Site chemical store
Comments	

Trade Name	2-phenoxyethanol
Supplier/Manufacturer	
Active incredient	Tricaine methane sulphonate
MSDS sheet	Supplied
Maximum Storage	50 litres made up solution per year
Storage	Site chemical store

Cleaning and Disinfection

Trade Name	G101
Supplier/Manufacturer	AutoSmart
Active incredient	Sodium hydroxide, alkyl dimethylamine betaine
MSDS sheet	Supplied
Maximum Storage	50 litres per site per month
Storage	Site chemical store

Trade Name	Iodet
Supplier/Manufacturer	
Active incredient	Iodine
MSDS sheet	Supplied
Maximum Storage	50 litres per site per month
Storage	Site chemical store

Trade Name	Fam 30 Iodophor
Supplier/Manufacturer	Evans Vanodine International Pie.
Active incredient	Iodine
MSDS sheet	Supplied
Maximum Storage	50 litres per site per month
Storage	Site chemical store

Trade Name	Virkon S
Supplier/Manufacturer	Merck
Active incredient	Pentapotassium (bis) peroximonosulphate (bis) sulphate, benzene-sulphonic acid, sulphamic acid, dipotassium peroxodisulphate
MSDS sheet	Supplied
Maximum Storage	50 litres per site per month
Storage	Site chemical store

Trade Name	Virasure
Supplier/Manufacturer	Fish Vet Group
Active incredient	Potassium monopersulphate, sulphamic acid, sodium alkyl benzene sulphonate, sodium chloride
MSDS sheet	Supplied
Maximum Storage	50 litres per site per month

Storage	Site chemical store

Trade Name	Aqua Des
Supplier/Manufacturer	Aquatic Hygiene Ltd
Active incredient	Hydrogen peroxide, acetic acid, peracetic acid
MSDS sheet	Supplied
Maximum Storage	50 litres per site per month
Storage	Site chemical store

Trade Name	Somplex Fatsolve
Supplier/Manufacturer	Diversey
Active incredient	Sodium alkylbenzenesulphonate
MSDS sheet	Supplied
Maximum Storage	2.5 litres per site per month
Storage	Site chemical store

Trade Name	Tego Hypochlorite
Supplier/Manufacturer	Tego Hygiene, MacGregor Industrial Supplies
Active incredient	1-alkyl-1,5-diaza pet a ne
MSDS sheet	Supplied
Maximum Storage	5 litres per site per month
Storage	Site chemical store
Comments	Used for cleaning & disinfection

Trade Name	Tego 2000
Supplier/Manufacturer	Diversey
Active incredient	Amines, n-Cl0-16-alkyltrimethylenedi-, reaction product with chloroacetic acid
MSDS sheet	Supplied
Maximum Storage	50 litres per site per month
Storage	Site chemical store

Trade Name	Hamid Chloramine T
Supplier/Manufacturer	Axcentive
Active incredient	Sodium p-toluenesulfonchloramide

MSDS sheet	Supplied
Maximum Storage	50 litres per site per month
Storage	Site chemical store
Comments	Used occasionally for cleaning & disinfection

Anti-Corrosion

Trade Name	Jotamastic 87/Jotamastic 87 Aluminium
Supplier/Manufacturer	Jotun
Active incredient	Polyamine cured epoxy mastic
MSDS sheet	Supplied
Maximum Usage	As required
Storage	Site chemical store
Comments	In the event of repairs only

Antibiotics (which might be used)

Trade Name	Vetremox
Supplier/Manufacturer	Pharmaq Ltd
Active incredient	Amoxycillin trihydrate 100%
MSDS sheet	Supplied
Maximum Usage	As required
Storage	Brought on site only as required for immediate use

Trade Name	Aquatet
Supplier/Manufacturer	Pharmaq Ltd
Active incredient	Oxytretracycline hydrochloride 100%
MSDS sheet	Supplied
Maximum Usage	As required
Storage	Brought on site only as required for immediate use

Trade Name	Branzil
Supplier/Manufacturer	Pharmaq
Active incredient	Oxolinic acid 100%
MSDS sheet	Supplied
Maximum Usage	As required
Storage	Brought on site only as required for immediate use

Trade Name	Florocol
Supplier/Manufacturer	Schering-Plough Animal Health
Active incredient	Florfenicol 50%
MSDS sheet	Supplied
Maximum Usage	As required
Storage	Brought on site only as required for immediate use

Trade Name	Sulfatrim
Supplier/Manufacturer	Novartis Animal Vaccines
Active incredient	Trimethoprim and sulfadiazine 1:5 50%
MSDS sheet	Supplied
Maximum Usage	As required
Storage	Brought on site only as required for immediate use

Net Antifouling (which might be used)

Trade Name	Netpolish
Supplier/Manufacturer	NetKem AS
Active incredient	Emulsion
MSDS sheet	Supplied
Maximum Usage	500l/80m net
Storage	Offsite

Trade Name	Netrex AF
Supplier/Manufacturer	Mobil Oil
Active incredient	Copper (I) oxide, wax emulsion Supplied
MSDS sheet	S00l/80m net
Maximum Usage	Offsite
Storage	

Trade Name	Netwax
Supplier/Manufacturer	NetKem AS
Active incredient	Wax emulsion, copper (I) oxide
MSDS sheet	S00l/80m net
Maximum Usage	Supplied

Storage	Offsite
Trade Name	AquaNet
Supplier/Manufacturer	NetKem AS
Active incredient	Copper (I) oxide
MSDS sheet	Supplied
Maximum Usage	500l/80m net.
Storage	Offsite
Trade Name	Flexgard VI
Supplier/Manufacturer	Flexabar Corporation
Active incredient	Copper (I) oxide, ethylene glycol, dichlofluanid
MSDS sheet	Supplied
Maximum Usage	S00l/80m net
Storage	Offsite
Trade Name	Flexgard VIII
Supplier/Manufacturer	Flexabar Corporation
Active incredient	Ethylene glycol, dichlofluanid
MSDS sheet	Supplied
Maximum Usage	S00l/80m net
Storage	Offsite
Trade Name	Flexgard XI
Supplier/Manufacturer	Flexabar Corporation
Active incredient	Copper (I) oxide, polyvinyl/acrylic copolymer, ethylene glycol
MSDS sheet	Supplied (2 versions)
Maximum Usage	Max working concentration copper (I) oxide 3%. 500l/80m net, product diluted 50% before use.
Storage	Offsite

Other

Trade Name	Paramove 50/Asperix Vet, 49.5% Hyrdogen Peroxide concentrate/Salartect 500 350

Supplier/Manufacturer	Solvay Chemicals International/Evonik Resource Efficiency/Brenntag
Active incredient	Hyrdogen Peroxide
MSDS sheet	Supplied
Maximum Usage	Applied to reduced treatment volume at 3kg/m3. Up to 8x treatments per production cycle.
Storage	