



## Ministry of Environment

### Pesticide Use Permit Application

This application is submitted under the *Integrated Pest Management Act* to obtain a permit for the use of pesticides as prescribed under the Integrated Pest Management Regulation (IPMR)Section 18. Following the submission of this application, the applicant will be provided an application number by ministry staff and instructed to consult the public in accordance with IPMR Section 60. The applicant must submit evidence of consultation and a statement of action proposed in response.

Permit  
Application  
Number:

Pesticide use may not proceed unless a permit has been issued.

A fee of \$1,000 must be submitted with this application. The fee is non-refundable once processing has occurred.

**PLEASE PRINT CLEARLY. PROVIDE ADDITIONAL SHEETS IF REQUIRED.**

#### 1. Full Legal Name of Applicant

This name must be a Limited or Incorporated Company registered with the BC Registrar of Companies. Please provide the name exactly as registered along with the incorporation registration number. **If the applicant is not a Limited or Incorporated Company use full personal name.**

Cermaq Canada Ltd		BC0744602	
Applicant's Name		B.C. Incorporation Registration #	
		Tom Foulds	
Business Operating Name, if different from above (i.e. Doing Business As )		Name of the Contact Person for the Permit	
203	919 Island Highway	Campbell River	BC
Suite #	Street Name and Number	City	Province
tom.foulds@cermaq.com	(250) 286- 0022 ext 2241	V9W 2C2	Postal Code
E-mail Address	Area Code + Telephone #	Area Code + Cell Phone #	

#### 2. Name of the Owner or Manager of the Treatment Location

Treatment Locations are Crown Land operated by Cermaq Canada under Licence of Occupations:  
Land File #'s – 1407983, 1403267 & 2403035

#### 3. Purpose of Proposed Pesticide Use

Topical removal of Sea Lice (*lepeophtheirus salmonis*)

#### 4. Proposed Start and End Date of Pesticide Use

	2018	01	10			2021	01	09
Commencement Date	Yr.	Mo.	Day	Completion Date		Yr.	Mo.	Day

#### 5. Description of the Geographic Area to be covered by the Permit

Describe the location of the proposed treatment area:

Finfish Aquaculture facilities are located on the East Coast of Vancouver Island in Okisollo Channel and Raza Passage in the Discovery Islands, approximately 32km North of Campbell River.

See attached Maps x 4.(General Area , Brent Island, Venture Point & Raza Island Facility Maps)

For MOE IPM Office Use Only			
Date received:		Date permit mailed:	
Payment	OK ( )	Not Attached ( )	Incomplete ( ) or Incorrect ( )
Log No.:	Permit Expiry Date:		Permit No:
Application Processed by:	Referral to BCPCC ( ) Regions ( ) ( ) ( )		Region(s):

## 6. Type of Pesticide Use Requiring a Permit

Please check the category below that corresponds with your intended pesticide use. Note: the category must be for a pesticide or pesticide use as prescribed under the Integrated Pest Management Regulation Section 18.

- a)  Permit-restricted pesticide
- b)  Aerial application of a pesticide
- c)  Use of a pesticide in or on a body of water
- d)  Use of a pesticide on public land not prescribed as requiring a licence or confirmation
- e)  Use of a pesticide under a confirmation or licence requiring an exemption from the applicable prescribed standards in Division 7, Part 2 of IPMR

If the prescribed use for which a permit is required falls under e) above, provide details of the regulated standard that the permit applicant considers impractical to meet and why. Propose alternative terms and conditions that in the opinion of the applicant will not cause unreasonable adverse effects.

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## 7. Pesticide Information

a. Active Ingredient (common name)	b. Pesticide Trade Name	c. P.C.P. No.	d. Application Rate (kg a.i./ha)	e. Treatment Area (ha)	f. Quantity (kg a.i.)
Hydrogen Peroxide (H <sub>2</sub> O <sub>2</sub> )	Interrox Paramove 50	31393	1.8g/Lt	3.44Ha	615,600Lt

## 8. Application Method

Paramove 50 will be used in accordance with the directions on the product label and the PMRA. Application will be administered by either enclosed tarpaulin or Well Boat.

Tarpaulin treatments will require that the fish are seined and placed into tarpaulins to confine them in a specific volume of water, where the Paramove can be added quickly to attain the prescribed treatment concentrations. The fish will be held in the tarpaulins for a maximum of 30 minutes with ongoing oxygen monitoring. Upon completion of the timed treatments the tarpaulins will be released allowing in saltwater which will then neutralize the bath.

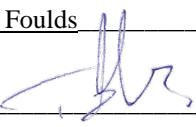
Well boat treatments will require that the fish are seined and pumped into the well boat and held in the required concentration of Paramove for 30 minutes. The fish will then be pumped out of the well boat and back into the net cage. The treatment bath inside the boat will then be neutralized with additional seawater, filtered and discharged. The health and welfare of the fish stocks will be monitored throughout the treatment process by Fish health staff.

## 9. Signature

The undersigned declares that the use of pesticides under the authority of this permit will comply with the *Integrated Pest Management Act* and Regulation.

Print Name: Tom Foulds

Position Title: Licence and Compliance Officer

Signature: 

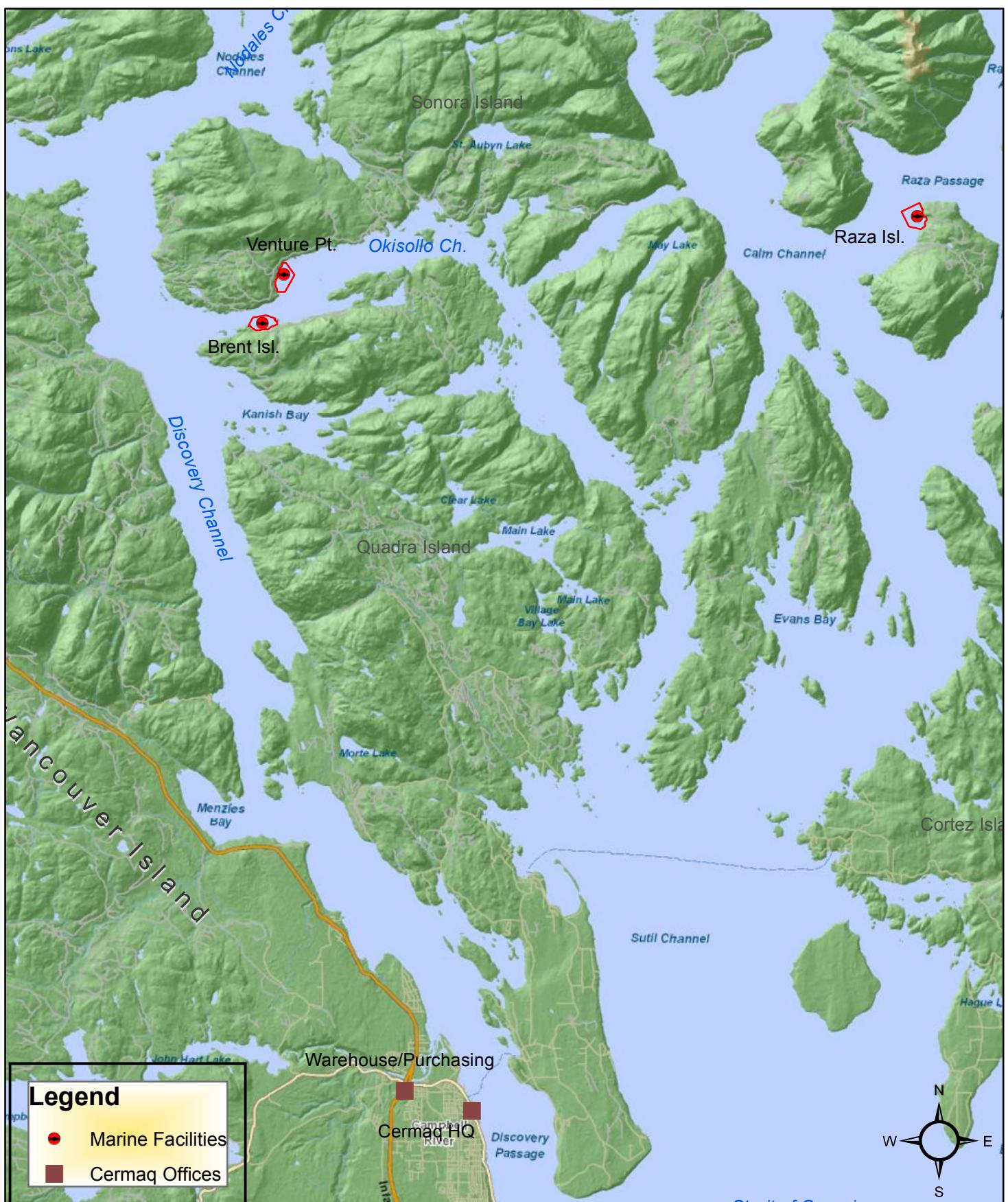
Date: 12<sup>th</sup> September, 2017

Clearly mark the location of sites where pesticide use is intended.



Cermaq Canada Ltd  
Discovery Islands Operations

1:300,000

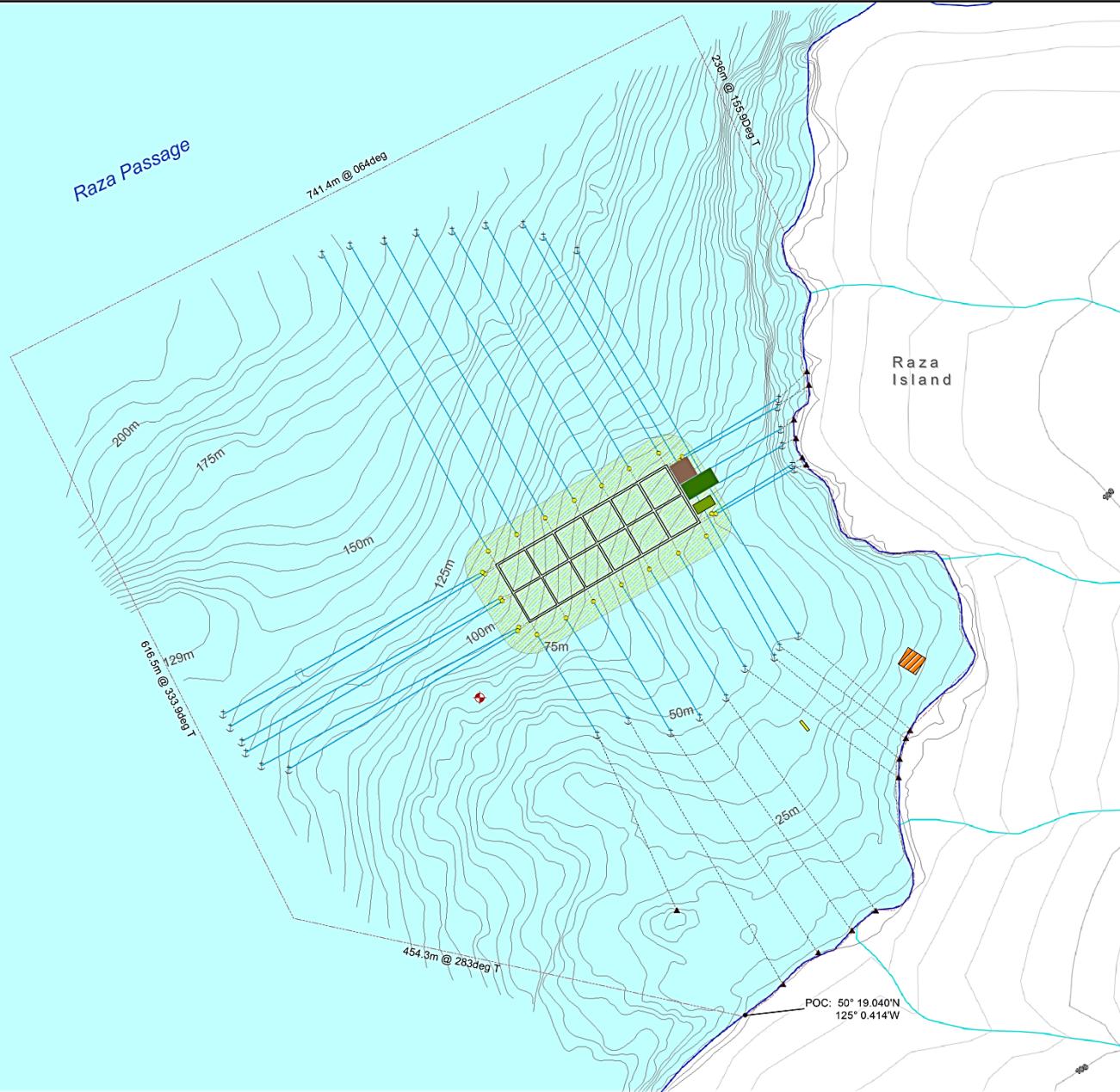


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**Raza Island**  
**Marine Finfish Facility Reference # 304**  
**Land File # 2403035**

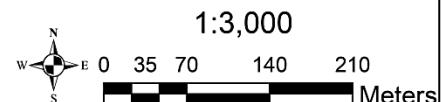
**CERMAQ**



Visitor Dock	Cage Array (30m)
Mort Float	Tenure (57.6Ha)
Work Float	Paramo...
Accom... Float	Dispers... Buffer (30m)
Feed Barge	
Current Profiler	

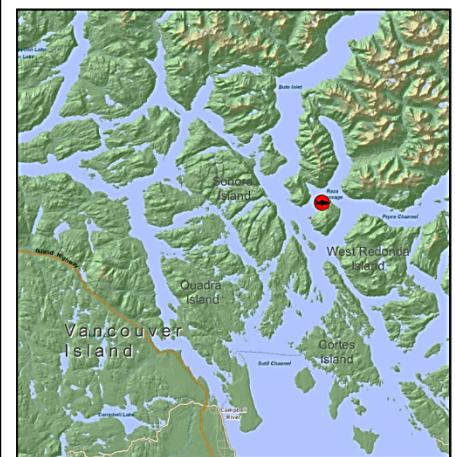
**Cage Corner Coordinates**

N -  $50^{\circ} 19.336'N$   $125^{\circ} 0.476'W$   
 E -  $50^{\circ} 19.304'N$   $125^{\circ} 0.447'W$   
 S -  $50^{\circ} 19.252'N$   $125^{\circ} 0.590'W$   
 W -  $50^{\circ} 19.284'N$   $125^{\circ} 0.620'W$



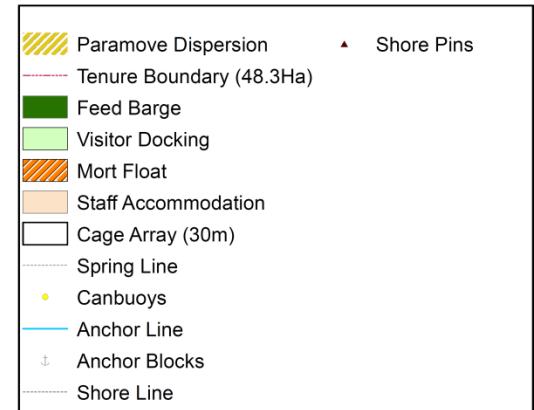
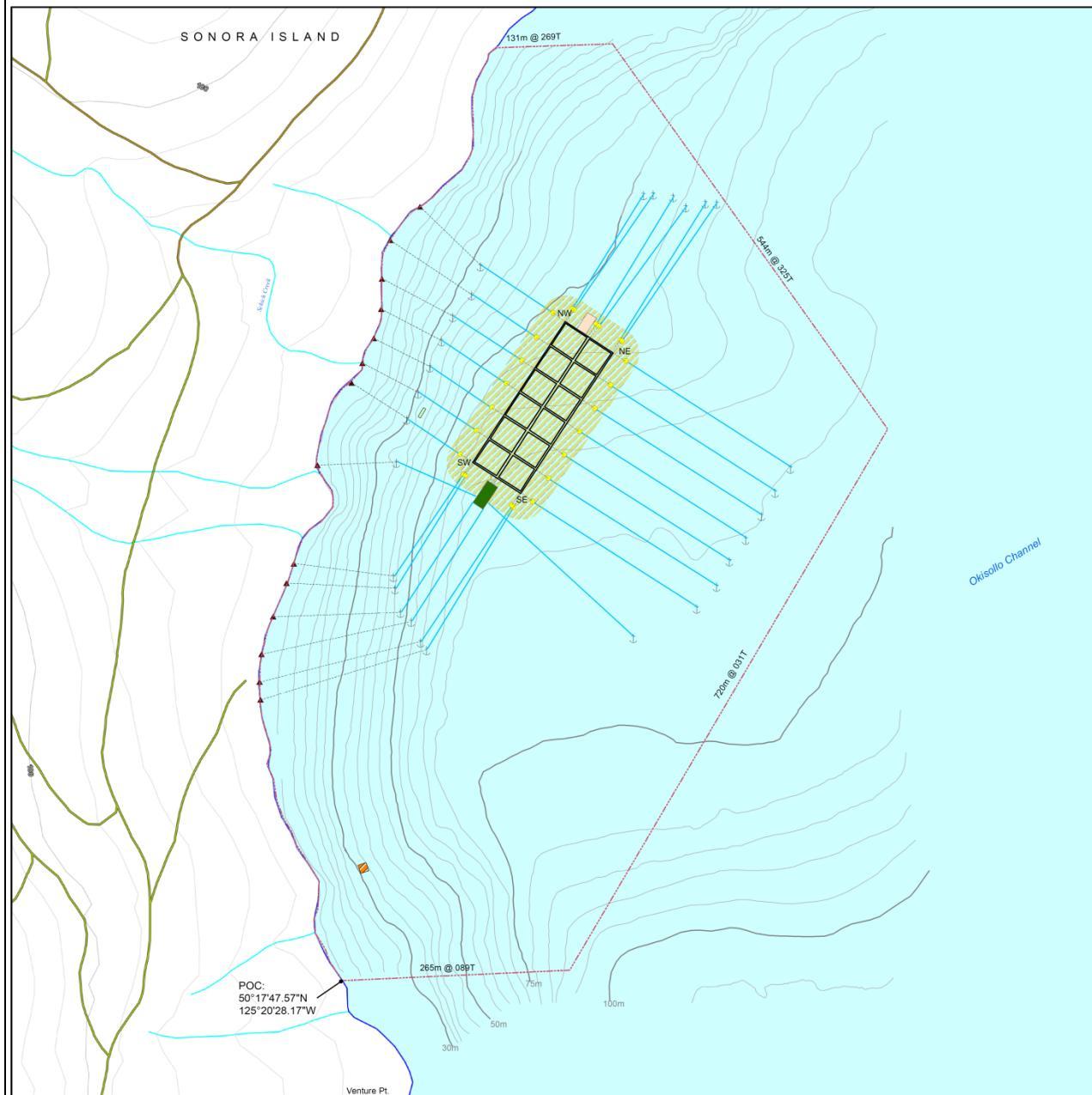
Coordinate System: NAD 1983 BC Environment Albers  
 Projection: Albers  
 Datum: North American 1983

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**Venture Point**  
**Marine Finfish Facility Reference # 306**  
**Land File # 1403267**

**CERMAQ**

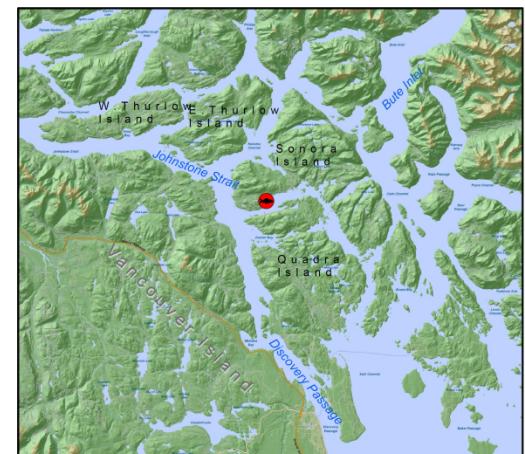


**Cage Corner Coordinates**

NW - 50° 18.197'N, 125° 20.244'W  
 NE - 50° 18.177'N, 125° 20.199'W  
 SE - 50° 18.091'N, 125° 20.289'W  
 SW - 50° 18.111'N, 125° 20.335'W



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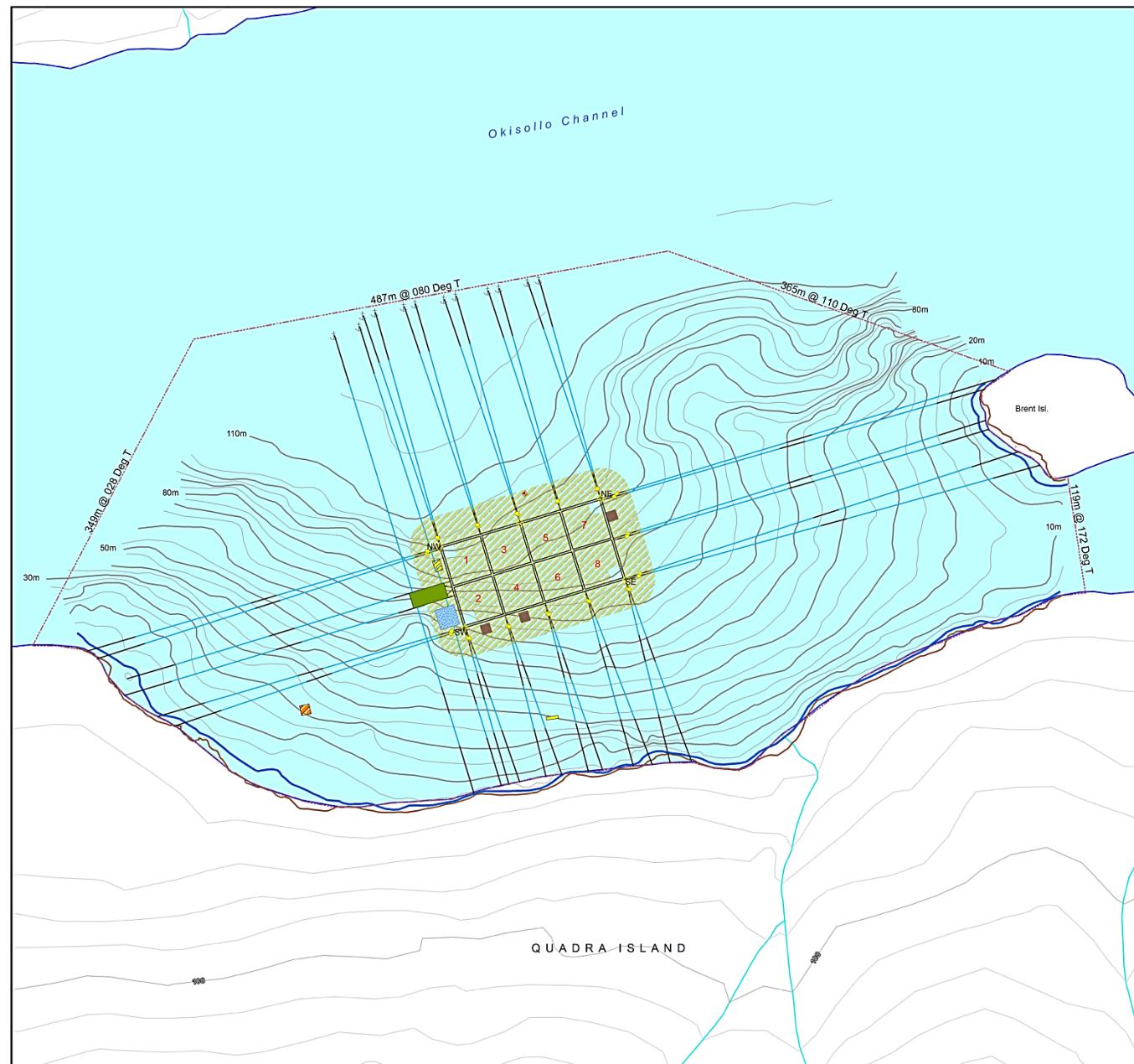


# BRENT ISLAND

## Marine Finfish Facility Reference # 1401

### Land File # 147983

CERMAQ



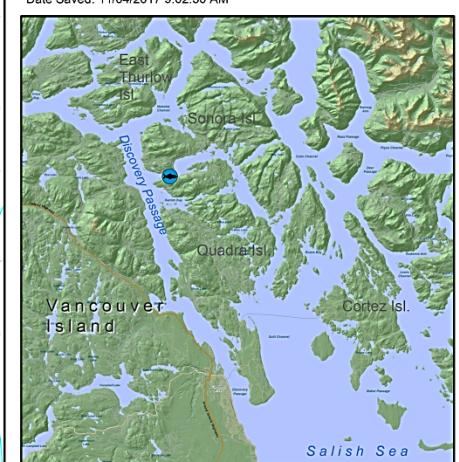
Feed / Accom... Float	□ Cage Array (40m)	Tenure (41.03Ha)
Visitor Dock	• Canbuoy	
Work Float	■ Paramove Dispersal Area	
O2 Barge	— Anchor Rope	
Ensilage Barge	— Anchor Chain	
Mort Float	‡ Anchor	
Navigation Marker	◆ Current Profiler	
Canbuoy		
Paramove Dispersal Area		
Anchor Rope		
Anchor Chain		
Anchor		
Current Profiler		

#### Cage Corner Coordinates

NW - 50° 17.171'N, 125° 21.027'W  
 NE - 50° 17.197'N, 125° 20.889'W  
 SE - 50° 17.152'N, 125° 20.868'W  
 SW - 50° 17.126'N, 125° 21.006'W



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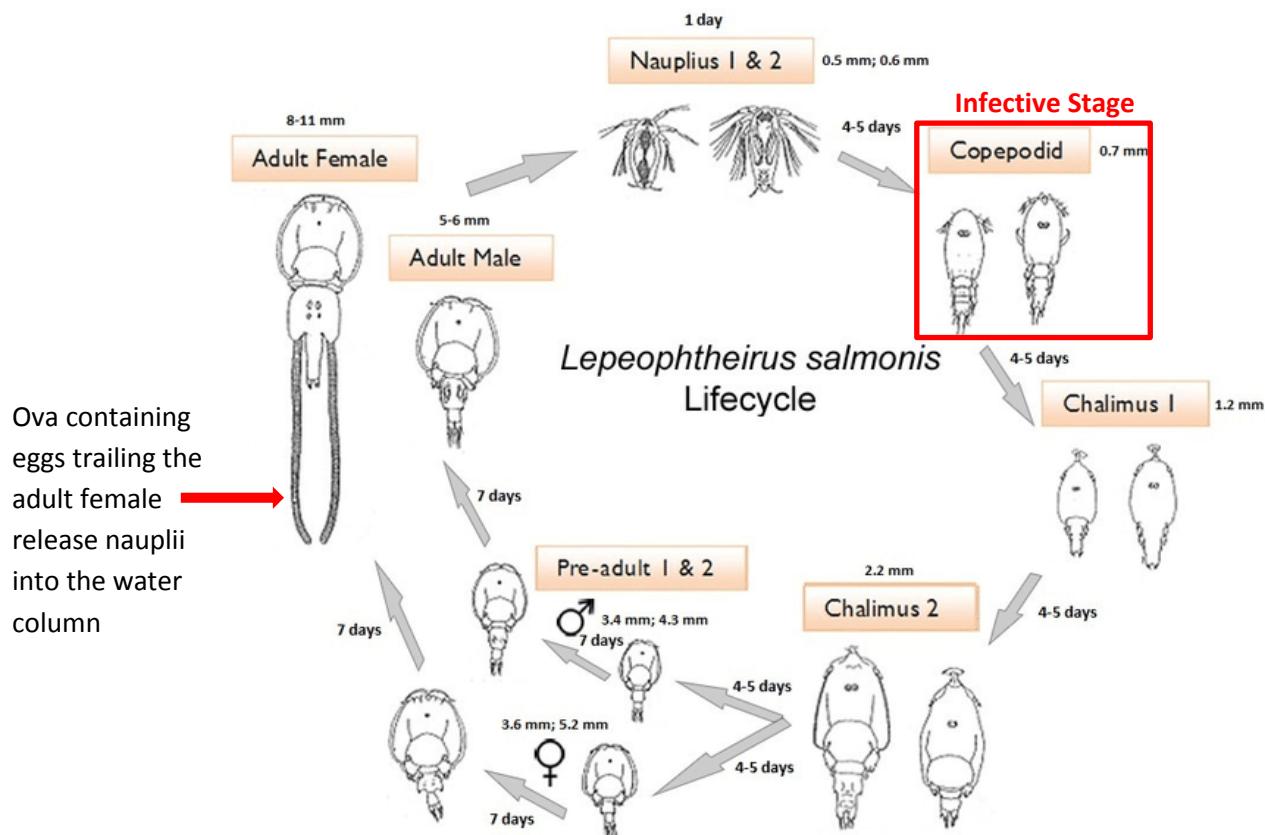


## **Appendix II: Sea Lice Overview**

Sea lice are parasitic copepods (Order Siphonostomatoida, Family Caligidae) found in the marine environment. The two genera, *Lepeophtheirus* and *Caligus*, are commonly found parasites of wild and farmed salmonids. The dominant species affecting salmonids in British Columbia waters is *Lepeophtheirus salmonis*. The life cycle (Figure 1) involves 2 larval stages, planktonic nauplii and the infectious phase copepodid which first attaches to the host. The copepodid enters the chalimus stage denoted by a specialized frontal filament that is used to attach to the host. Upon reaching the pre-adult stage the louse becomes motile before finally maturing into reproductive adults. The generation time is temperature dependant, and can vary from 38 to 72 days. Lice are readily transferred from wild adult returning salmon in late summer and early fall, via egg laying adult female lice dispersing nauplii into the water column. Lice levels, survival and fecundity are influenced by a number of factors including adult wild returns (more adult wild returning salmon = more lice), salinity (lower salinity = fewer sea lice as they do not tolerate lower salinities), temperature (higher temperature = faster lice growth and reduced life cycles), oceanographic factors impacting distribution, and presence of filter feeders such as mussels that feed on nauplii and copepodids within the planktonic community. To reduce the potential for lice from farmed fish to impact outmigrating smolts, lice levels are monitored every two weeks during the smolt outmigration period (March 1<sup>st</sup> to June 30<sup>th</sup>). During this period treatment or harvest to reduce lice levels is required if levels rise above 3.0 motile lice (pre-adults and adults) per fish sampled. Lice levels routinely increase late summer and early fall with returning adult pacific salmon.

Sea lice use specialized mouthparts to graze upon salmon, removing skin, mucus, and tissue. Impacts of grazing include epithelium loss, bleeding, and tissue necrosis. This can affect the fish's ability to prevent physical damage and to fight off bacterial infections. Other impacts can include reduction in appetite, feed conversion rate and therefore growth.

When levels reach an average of 3 motile sea lice per fish a treatment using the active ingredient Emamectin benzoate (SLICE) has historically been used effectively. To measure the effectiveness of the drug on the sea lice, a bioassay is performed. This assay consists of sampling sea lice from the infected population to be treated then exposing the sampled louse to increasing concentrations of the active ingredient. As indicated from the results found in table 1 we have observed that lice sampled from Bawden Farm have remained sensitive to Emamectin benzoate. However in table 2, a subsequent bioassay showed resistance to Emamectin benzoate. It is the genetic variation within different lice populations that can, if repeatedly exposed to the same product, result in reduced sensitivity to products. Any effective integrated pest management plan, including all farmed animals and crops, requires coordinated treatments, coordinated fallowing, and alternation of treatment classes. The coordination of treatments and fallowing of sites is already put in place. An alternative product such as Hydrogen Peroxide would be a useful tool to ensure we responsibly manage pests such as sea lice.



**Figure 1:** Planktonic Nauplius 1 & 2 transform in 4-5 days to the infective stage Copepodid. Once attached, becomes Chalimus stages to pre-adult to reproductive adults in 34-67 days, depending on temperature and feeding.

Table 1 – Bioassay results for Sea Lice sampled from Bawden Point 07-Jun-17 exposed to increasing concentrations of Emamectin benzoate (SLICE) for 0 hours and 24 hours.

0 hr (# of live lice)

Replicate	1	2	3	1	2	3
Concentration (ppb)	Female #1	Female #2	Female #3	Male #1	Male #2	Male #3
0	9	10	10	10	10	10
31.3	9	10	10	10	10	10
62.5	9	10	10	10	11	10
125	9	10	10	10	10	10
250	10	10	10	10	10	10
500	9	10	10	10	10	10

24 hr (# live lice)

Replicate	1	2	3	1	2	3
Concentration (ppb)	Female #1	Female #2	Female #3	Male #1	Male #2	Male #3
0	9	10	10	10	10	10
31.3	8	9	10	10	9	10
62.5	9	4	3	10	11	10
125	4	1	1	7	10	7
250	0	1	3	3	1	3
500	1	2	0	1	1	3

Female Lethal Dose (50%) = 83.28 ppb  
Upper 95% = 105 ppb Lower 95% = 65.9 ppb

Male Lethal Dose (50%) = 206.6 ppb  
Upper 95% = 246.9 ppb Lower 95% = 173 ppb

Table 2 – Bioassay results for Sea Lice Sampled from a site exposed to increasing concentrations of Enamectin benzoate for 0 hours and 24 hours

0 hr (# of live lice)

Replicate	1	2	3	1	2	3
Concentration (ppb)	Female #1	Female #2	Female #3	Male #1	Male #2	Male #3
0	10	10	10	10	10	10
31.3	11	10	10	10	8	10
62.5	10	10	12	10	10	10
125	11	10	10	10	10	10
250	11	10	11	10	10	10
500	10	10	10	10	10	10

24 hr (# of live lice)

Replicate	1	2	3	1	2	3
Concentration (ppb)	Female #1	Female #2	Female #3	Male #1	Male #2	Male #3
0	10	10	10	10	10	10
31.3	11	10	9	10	8	10
62.5	10	10	12	9	10	10
125	8	10	9	10	9	9
250	11	9	9	10	10	10
500	9	9	5	10	10	9

## Appendix II

### Storage and Application

Paramove 50™ will be stored in a fenced secure location prior to application at farms. This requires isolated storage and separation, free from combustibles and other chemicals/flammable materials. The storage tanks will regularly be inspected and monitored by cameras. Safe and secure storage and transport in appropriate containers will ensure the containment of Paramove 50™ to prevent adverse impacts to water quality and non-target organisms.

Paramove 50™ will be contained either in a secured well boat or tarpaulins during application to farmed fish, which will prevent adverse impact to non-target organisms and water quality.

Prior to tarpaulin application, all nets ropes, and other in-water infrastructure will be pressure washed and thoroughly cleaned to remove any organic material. This will help to reduce the total amount of Paramove 50™ to be used during treatments and prevent adverse impacts to non-target organisms.

Titration will occur at several locations within the tarp to monitor the concentration of Paramove 50™ every five minutes during treatment. After the tarpaulins are removed the water quality within the net pen will be tested at two and five minutes to ensure concentration of Paramove 50™ has reduced to 0ppm.

Five minutes following treatment, water quality will be tested at four sampling stations 30 m from the sides of the farm closest to the treated pen to confirm that there are no detectable levels of Paramove 50™, thereby preventing adverse impacts to water quality and non-target organisms. The four sampling stations will be tested at 1m, 5m, and 10m depths.

### Training

Staff that will help lead the application of Paramove 50™ will be Barry Milligan (Fish Health Director and Veterinarian), German Campos (General Manager of Operations), and Brock Thomson (Director of Operations). German Campos, Brock Thomson, and Barry Milligan are familiar with the application methods and requirements as well as the monitoring protocols.

The following training has been provided to ensure the safe and effective application of Paramove 50™, thus preventing adverse impacts to water quality on human health, or detrimental effects to the environment and wildlife.

Course	Description	Provided by	Participants	Date
Health and Safety – H <sub>2</sub> O <sub>2</sub> handling and awareness	Physical and chemical properties of H <sub>2</sub> O <sub>2</sub> , first aid and health standards, decomposition, safe handling and storage, acceptable and unacceptable materials to use, equipment requirements, procedures for accidents, spills, fire. Safe transfer and filling procedures for ISO containers	Ian Armstrong, Course Supervisor, Aqua Pharma Ltd.	Operations Director, Area Production Manager(s), Fish Health Technician	May 2016
Pesticide Applicators Certification	Designed for Interox Paramove 50™ application for sea lice treatment in marine environments	Art Guite B.Sc., M.P., P.Ag., RPHA (C)	Barry Milligan (Fish Health Director & Veterinarian) James Costello (Area Production Manager) Jason Pearson (Area Production Manager)	March 2017
General Safety and Equipment Training	Safe handling, storage, transport and administration of Paramove 50™	Cermaq Canada	All staff involved in the treatment and present at site during treatment	