

**BEFORE THE MARLBOROUGH SALMON FARM RELOCATION ADVISORY PANEL  
AT BLENHEIM**

**UNDER** the Resource Management Act 1991  
**IN THE MATTER** of Regulations under ss 360A and 360B of the Act  
**BETWEEN** **THE MINISTRY FOR PRIMARY INDUSTRIES**  
**Applicant**  
**AND** **THE MARLBOROUGH DISTRICT COUNCIL**

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**STATEMENT OF EVIDENCE OF RUBEN ALVAREZ IN SUPPORT OF THE NEW ZEALAND  
KING SALMON CO. LIMITED'S SUBMISSION**  
Dated this 11th day of April 2017

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## **Introduction**

- 1 My name is Ruben Alvarez. I am the Chief Operating Officer at New Zealand King Salmon (NZ King Salmon). I have over 25 years' experience in the fish farming industry, both overseas and in New Zealand.
- 2 I have worked with a range of different finfish species, including King salmon, Atlantic salmon, Coho salmon and trout. I have also worked with Amberjacks, sea cucumbers, and Barramundi.
- 3 I have a broad understanding of the different approaches to finfish farming around the world, having worked in Norway, Scotland, Saudi Arabia and Chile.
- 4 My experience means that I have the ability to share best practices from six worldwide regions. I bring that knowledge and experience to my role with NZ King Salmon.

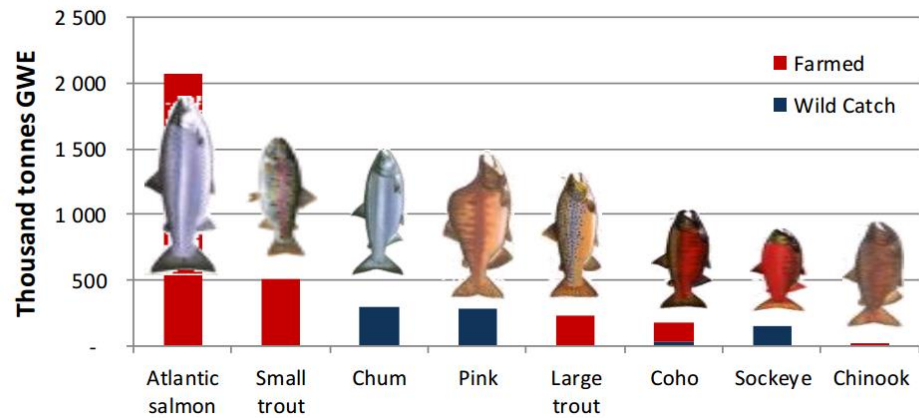
## **NZ Comparison with Overseas**

- 5 If you compare the world's total salmon production to our King Salmon production we only produced 0.6% of the salmon harvested in the world in 2016.<sup>1</sup>
- 6 The salmon market has increased by 6% in the last 10 years, and by 8.6% in the last 20 years.<sup>2</sup> These figures prove that the market is continuing to grow.
- 7 NZ King Salmon produces approximately 7,000 metric tonnes of salmon annually. Our production is small compared to other major salmon suppliers, for example:
  - (a) Marine Harvest, Norway: 254,000 tons
  - (b) Marine Harvest, UK: 50,000 tons
  - (c) Cook Aquaculture, Canada: 42,000 tons
  - (d) AquaChile, Chile: 63,000 tons
  - (e) Tassal, Australia: 23,000 tons.
- 8 New Zealand production is smaller than the smallest companies in Chile and Norway.

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<sup>1</sup> Figures taken from Salmon Farming Industry Magazine, Marine Harvest 2016.

<sup>2</sup> Information from Kontali Analysis.



**Total Salmon production and wild catch around the world**

## Alternatives to the Site Relocation Proposal

### *International Opportunities*

- 9 There are limited options for farming King salmon overseas, because most countries have closed their borders to egg imports:
  - (a) Norway – Closed
  - (b) UK - Closed
  - (c) Australia - Closed
  - (d) Chile – Partially open
  - (e) Canada – Different genetics to King salmon in NZ, and BKD-Disease (Bacterial Kidney Disease), therefore only one King salmon company - Creative Salmon (1000 tons/year).
- 10 We could go to Canada, but we would have to use local King salmon, which do not have the same genetics. Chile has slightly more open borders and we could use our own genetics, but it would take at least 5 years of proof that our fish are free of disease. Chile also has diseases that can affect King salmon i.e. BKD, SRS (Salmon Rickettsial Syndrome).
- 11 Russia is starting to look into King Salmon and Atlantic Salmon, so they are going to be an option in the long term. However, they face many challenges such as temperature profiles are quite dramatic, vast extremes with frozen oceans, lack of experienced Aquaculture experts and many limitations for working visas. There are also several cultural and political constraints.

### *Future offshore farming*

- 12 Today offshore technology is completely unproven. There are a few projects being run in Norway so we can use those as example. As of November 2015, there were 26 concept applications to develop both offshore and inshore solutions in both closed and open structures (see examples in photos below).



***THE BECK CAGE submersible offshore farming cage***



***OCEAN FARM 1***



***Name of the project: CONVERTED BULK VESSEL***

- 13 All these projects are incredibly underdeveloped, for example the BECK CAGE that was published in a Marine Harvest Document in 2016 as a potential offshore option. The BECK CAGE has now been rejected due to technical flaws in the design:

March 3, 2017, 9:39 am

[Neil Ramsden](#)

Norway's directorate of fisheries has confirmed offshore salmon concepts by Marine Harvest's and Norway Royal Salmon (NRS) fall within its criteria for development licenses, giving them the greenlight to proceed to the next stage of discussion.

However, while Marine Harvest's 'donut' concept has been approved for further dialogue, the 'Beck cage' concept has been turned down.

In a letter to Marine Harvest the directorate listed numerous technical reasons why it felt the Beck cage concept application did not meet its strict requirements, including a lack of clarity on the proposed cages' dimensions, and how they would supply the fish with oxygen and feed.

One concluding paragraph of the letter states: "the applicant has not described the concept, the status of the project or how the project will meet innovation requirements in an adequate manner."

- 14 A proven offshore technology is hopefully going to be available in the next 10 years. A new technology must go into a pilot design first, then move into commercial scale where it would need to be proven by at least 2 or 3 cycles with good results. Three cycles would effectively add another 10 years on lead time. Cost efficiency also needs to be considered. It is easier to adopt new projects if you are a large scale company, as you can then deal with the consequences if there is an issue.

*Land based systems (flow-through freshwater and closed containment systems)*

- 15 One of the most prestigious Aquaculture institutes in Norway, SINTEF, has undertaken a Norway land based production comparison with sea farms:

Comparison of harvesting 3,300 tons of salmon - Land vs Sea

- (a) Set up costs: \$12.3 million US for sea pens vs \$32 million US for a land-based facility;
- (b) Land based is 3 x more costly. Far greater costs per square metre of construction to cover the same amount of tonnage production.
- (c) In order to be cost efficient you need to grow fish at very high density of 80kg/m<sup>3</sup>, in comparison to 20kg/m<sup>3</sup> in the ocean. High density culture

impacts upon fish welfare, and the energy needed to run water pumps is considerable. In addition the earth is 70% water and only 30% land – I wonder what is the point to try to bring aquaculture to land base facility (?).

- 16 Another element that needs to be addressed is the off flavour of fish produced in a closed containment structure.

### **Risk management**

- 17 NZ King Salmon has extensive risk management procedures in place to manage various operational and environmental risks. Potential risks are:

#### *Storms*

- 18 Strong waves and currents can destroy our pens. We work with complex 3D mooring modelling systems to simulate worst case scenarios. One of the software that we use is AquaSim, a time-domain FEA (Finite Element Analysis) software owned and developed by Aquastructures.
- 19 AquaSim evolved from many years of research in Marine Technology and Civil Engineering at NTNU (Norwegian University of Science and Technology). It is an analytic tool with the ability to analyse and simulate flexible systems under the influence of sea currents, wind, and waves.
- 20 AquaSim has been used commercially for more than a decade, and is the leading simulation and analysis software for aquaculture facilities in Norway.<sup>3</sup> For local materials and more specific tools we use SOLIDWORKS simulations.<sup>4</sup>
- 21 We follow the highest standards in line with Norway. We allow a safety margin of 1.7 for all of our steel structures, and a 20% safety margin for our mooring lines and screw anchors. We have data loggers installed on our moorings where we collect data controlling the tension of the moorings. We have a replacement plan for our nets and pens and we are increasing the strength of our fish nets and predator nets to reduce the risk of net rips and fish loss.

#### *Diseases*

- 22 Due to strict New Zealand biological controls we do not import any biological material into NZ. We have a health monitoring programme in place to check for diseases. NZ King Salmon has internal Fish Health experts, and uses an external contractor Colin Johnston, from Brightwater consulting. We plan to bring on board a new fish pathologist with vast worldwide experience in health and biosecurity factors to have a close control of potential pathogens affecting our fish. Mark

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<sup>3</sup> [http://aquastructures.no/en/aquasim\\_en/](http://aquastructures.no/en/aquasim_en/)

<sup>4</sup> <http://www.solidworks.com/sw/products/simulation/simulation-premium.htm>

Preece and Graeme Aldridge discuss biosecurity and/or fish health in more detail in their evidence.

- 23 We monitor environmental risks on a daily basis:
- (a) Water parameters, including temperature, oxygen, and visibility (using a Secchi disk - a plain white, circular disk 30 cm (12 in) in diameter used to measure water transparency in large bodies of water); and
  - (b) Algae - at every farm we have well trained staff to identify micro algae and react accordingly.
- 24 Cawthron Institute is an independent third party who analyses samples of the water column and seabed on a regular basis as per consent conditions.

### **Primary Processing**

- 25 NZ King Salmon has three factories located in Nelson, for primary processing, value added, through to Cold and hot Smoked products. NZ King Salmon currently employs 246 people in processing.
- 26 Our processing factories are able to process 8,000 tons of fish per year and >170 different products or SKU's per year for our three main brands, ORA King, Regal and Southern Ocean.
- 27 Fish come from farms located in the Marlborough Sounds by modern bulk tankers that are developed specifically to transport our fish with excellent temperature controls and hygiene standards. The fish are then pumped from the tanker straight to the primary processing line.
- 28 King Salmon, similar to other fish, maintain the same body temperature as the surrounding sea water temperature. In order to produce a premium high quality fish we need to be specific, we need to drop the temperature as quickly as possible to be close to 0°C. In order to get the best results, we, together with the NZ company KAM Transport, have developed using New Zealand and Australian technology our bulk tankers with slurry ice. This technology results in vast temperature reduction of the fish, so that they arrive at the factory at 0°C (+/- 2°C).
- 29 NZKS have also developed a humane harvest method in order to be in line with our policy on animal welfare and to produce a high quality product. Our methods ensure a low stress environment for the fish during and after slaughter. This keeps the quality of the flesh high, and ensures freshness by:
- (a) Avoiding gaping: The cut surfaces of fish fillets show that the flesh consists of small blocks of muscle, for the most part rectangular in shape, bordered by thin shiny membranes of connective tissue. When a fillet is cooked, the connective tissue breaks down and the blocks of muscle separate easily and



fall apart; this is in effect an extreme form of gaping. The term gaping is the undesirable separation of muscle blocks in a raw fillet. Gapes are slits between muscle blocks, and can range from slight separation at the cut surface to complete separation right down to the skin of a fillet. Gaping spoils the appearance of fillets, making them difficult to sell and the skinning process difficult or impossible.

(b) Achieving lower rigor levels: Rigor mortis means the stiffening of the muscles of an animal shortly after death.

30 Our plant is a standard processing factory similar to other plants around the world. We have modern equipment and are constantly looking to innovate and improve our plant and equipment. For example, our last acquisition was a portion machine, which from a whole fish calculates the best cut from the fillet to a specific size in less than 2 seconds (+/- 2%), maximising the yield.

31 We use modern thermoformers to add better quality and freshness (see photos below).



***Thermoform Photo 1***





### ***Final product after Thermoform***

32 We are continually looking for new technologies in order to improve our quality and cost.

#### *Risk management - audits, compliance, food safety*

33 NZ King Salmon currently has 6+ certifications that allow us to supply different companies. We receive Auditors to validate our certifications to ensure we reach their specific standards.

34 Legal certifications to operate:

- (a) MPI RMP – Ministry for Primary Industries certification to operate a “Risk Management Programme” to sell product to the New Zealand market and export; and
- (b) MPI Export Licence – Ministry for Primary Industries certification to allow us to export products.

35 Status certifications:

- (a) Kosher – Certification of foods that conform to the regulations of kashrut (Jewish dietary law); and
- (b) Halal – Certification of food prepared in accordance of Muslim law.

36 Customer driven certifications:

- (a) BAP – Best Practice Aquaculture certification against prescribed standards set out by Global Aquaculture Alliance. We hold three stars covering hatcheries, farms and processing; and

- (b) WSE – Woolworths Supplier Excellence certification where suppliers must meet prescribed standards to supply certain produce to Woolworths.

### **The Future**

- 37 Considering that NZ is a country with more water than land, moving farming practices to the sea sounds logical. Mussels, and salmon are just a starting point for me. I believe there should be more high value species grown in New Zealand.
- 38 In my view New Zealand should also be looking at polyculture activity alternatives, where different species are grown alongside one another on the same site, resulting in mutual benefits, better use of space and better environmental outcomes.
- 39 Offshore development should occur as soon as the technology is available, safe and cost effective.
- 40 The sea farms can be improved in their appearance which apparently is one of the main points of opposition to the relocation, particularly from local residents.

### **Conclusion**

- 41 New Zealand is a country that is surrounded by the sea, with premium seafood products to be explored and farmed in sustainable ways. The most efficient way to produce high quality animal protein is by Aquaculture, similar to what NZ King Salmon is doing at our farm operations. I do not know any other industry that can come close to our yields and space, water consumption, feed conversion rate and even carbon emissions. There are many areas where we can improve and do better, having six farms located in high flow farms is going to help us to achieve this. We are going to have the opportunity to give our fish better conditions and improve the quality of all of our products.
- 42 NZ King Salmon is a well-known company worldwide with a highly valued reputation in the salmon world. I previously heard of NZ King Salmon during my time at Marine Harvest, which is the giant of the salmon industry. The recognition of NZ King Salmon as a unique company is based in our belief/courage to grow an extremely difficult fish to farm where many others have given up - resilience, perseverance, innovation in our processes to be able to produce a premium product together with an exceptional branding strategy.
- 43 We are going to create more value with 17 surface hectares than anyone else in NZ. We are going to continue to strengthen the reputation of NZ with our product.

*Ruben Alvarez*