Business Idea
We provide environmentally sound, safe and efficacious health products for the global aquaculture industry through targeted research and the commitment of dedicated people.
"Healthy seafood from global aquaculture has become of enormous importance to the world’s growing population. In this respect fish health management including use of efficient and safe vaccines, is instrumental to sustainability and further growth of this successful industry. I am convinced that PHARMAQ through its primary focus in vaccine development combined with the company’s ambitious global strategy will add substantial value to improved fish health and predictability to this industry."

Svein Rennemo, Chairman of the Board
PHARMAQ is recognized as the world’s leading pharmaceutical company specializing in aquaculture and the main products are vaccines for farmed fish. It is a Norwegian company established in 2004 and since November 2008 the major shareholders in PHARMAQ are Orkla ASA and Kverva Holding AS. The remaining shares of the company are held by PHARMAQ’s management and employees. The total number of employees in PHARMAQ per December 2009 is 118.

In Norway, PHARMAQ’s Oslo office comprises administration, research and development, regulatory affairs, intellectual property rights, sales and marketing. All PHARMAQ’s fish vaccines are manufactured at the factory at Overhalla in Norway. Since its establishment, 13 new fish vaccines have been developed and introduced in different markets.

Internationally PHARMAQ is represented through its subsidiaries in Chile, the United Kingdom and its representative office in Ho Chi Minh City, Vietnam. In other markets PHARMAQ operates through an extensive network of distributors and wholesalers.

The company has established its own PHARMAQademy®. In addition to providing for the development of our own staff, this initiative has become an important arena for meeting the aquaculture industry, nationally and internationally.

Highlights 2009

- ALPHA JECT® micro 2 vaccine for rainbow trout and coho salmon introduced in Chile
- PHARMAQ’s pancreas disease vaccine accepted by Norwegian Medicines Authority for special license
- The active substance teflubenzuron for sea lice treatment made available for Skretting
- Development and approval of the first autogenous Flavobacterium vaccine for Norwegian troutfarmers
- Extensive field trial of the first pangasius vaccine initiated in Vietnam
- PHARMAQ awarded as one of the top ten Great Place to Work companies in Norway
- PHARMAQ received the Internationalization prize 2009 by Innovation Norway

The Board of Directors from left to right: Svein Rennemo (Chairman), Inger L. Kvitvang, Jan Reid Hole, Kjetil Fyrand, Anne Waaler, Hans Vassgård Eid, Helge Moen

shareholders PHARMAQ Holding AS

Orkla ASA 36.8%
Kverva AS 36.8%
PHARMAQ employees 26.4%

PHARMAQ Holding AS
PHARMAQ AS
PHARMAQ AS Chile Ltda.
PHARMAQ Ltd.
PHARMAQ Vietnam Representative Office
2009 was a challenging year for PHARMAQ. Alongside the rest of the industry, we faced the dramatic fall in the Chilean salmon farming industry and more specifically our fight for market access for our pancreas disease vaccine in Norway. In spite of this, PHARMAQ moved forward and we continued in our leading position as a global supplier of fish health solutions.

However, 2009 was also a year for celebration. PHARMAQ was awarded the Internationalisation prize 2009 by Innovation Norway. This prize acknowledged all of our employees’ efforts in successfully introducing Norwegian technology throughout the world setting cutting edge international standards.

The Chilean Atlantic salmon smolt production in 2009 decreased by 80% of 2007 levels following major ISA outbreaks in the country. We have spent this year further developing our ISA vaccine and we are planning to introduce different ISA vaccines in 2010.

By helping the Chilean fish farming industry rebuild its sustainability, our clear commitment is to continue offering our premium fish health services through PHARMAQ Chile as well as development of new products. The successful first sales of our micro dose vaccine, ALPHA JECT Micro® 2 in 2009 indicated for rainbow trout and coho salmon in Chile proves that we can do it.

In Norway the export value from fish farming in 2009 reached a record value of more than 25 billion NOK, and the number of salmon and trout vaccinated were above 270 million. I am proud to say that through our customers experience and confidence in our products, every other Norwegian salmon was vaccinated with PHARMAQ vaccines last year!

“Through our expertise, we make a difference in the global aquaculture industry contributing to the supply of healthy food.”
Morten Kr. Nordstad, CEO

It was a huge disappointment when the Norwegian Competition Authority made their decision to reject market access to our well documented Pancreas Disease vaccine in 2009. My view is that we have lost one more opportunity to further improve fish health and welfare for the salmon industry. The Norwegian fish farming industry and their association supported PHARMAQ and strongly called for a new and improved vaccine available to the industry.

Sea lice outbreaks represent a major threat to aquaculture, fisheries and the aquatic environment. Last year we put a lot of resources in all our markets to help our customers establish best practice for bath treatments and we continued our search for new and improved products. There are very few therapeutic drugs available to eliminate sea lice. In 2009 PHARMAQ paved the way for the re-introduction of an oral sea lice product.
Further afield, PHARMAQ’s representative office in Vietnam in 2008 was our first step in exploring the huge potential of the Asian aquaculture industry. Vietnam produced more than 1.5 mill tons farmed pangasius in 2009, same as the total global production of farmed Atlantic salmon. Increasing environmental awareness, tractability and food safety security are key issues that need to be improved. Improved fish health management and introduction of new vaccines from PHARMAQ will be instrumental to the industry's continued success. These success criteria are in line with our strategy, and an extensive field trial for the first pangasius vaccine in Vietnam was initiated last year. In 2010 we will continue in strengthening our presence in Asia and prepare for the introduction of our first vaccine in the Vietnamese market.

2009 will be remembered by everyone as a difficult year trying to maintain and grow our activities in the midst of a global economic downturn. However our people worked hard and with great enthusiasm. By maintaining an attitude of ‘can do’ at the forefront of our minds I believe we are in good shape to embrace the challenges we shall face in 2010.

We are very proud of our company, our employees and our achievements.

Together - We make aquaculture progress.

Morten Kr. Nordstad
PHARMAQ’s strong global market share of vaccines for salmonids in sea water farming confirms the company’s leading position in 2009. In a year influenced by the difficult situation in the Chilean salmon farming industry, this is a result of the strengthening of PHARMAQ’s market position in the other salmonid markets in 2009.

In Norway the success of PHARMAQ’s new micro dose vaccine ALPHA JECT® micro 6 for salmon continued and more than 60 million doses were sold in 2009. Last year 55% of all salmon and trout vaccinated were injected with a PHARMAQ vaccine. This leading position was made possible only by the experience and confidence of our customers in PHARMAQ’s vaccines and services accompanied by a broad portfolio of products.

The Norwegian cod farming industry suffered through 2009 and high production cost combined with low market prices were the key drivers. The annual sales of vaccines were dramatically reduced from 31 million to 11 million vaccine doses of which PHARMAQ supplied more than 9 million vaccine doses in 2009.

Historically PHARMAQ holds a strong market position for vaccine sales to the Scottish and Irish salmon farming industries. The farmers’ product of choice is ALPHA JECT® 2-2 and PHARMAQ’s 78% market share in 2009 represented by 40 million fish vaccinated, confirms the company’s leading market position.

PHARMAQ has maintained a strong presence throughout the ISA crisis in Chile and we will contribute to the long term recovery of the Chilean fish farming industry. Most of the PHARMAQ’s Chilean vaccine sales of 44 million doses in 2009 targeted the rainbow trout and coho salmon segment with the new product ALPHA JECT® micro 2.

Since the establishment of PHARMAQ in 2004, eight different PHARMAQ vaccines have been launched to the benefit of Chilean fish farmers.

The therapeutic product segment mainly reflects the sales of the sea lice bath treatment product ALPHA MAX® (Deltametrina, AMX®) against sea lice. The product increased its sales substantially in Norway and Scotland and in 2009 it was also introduced in Canada. In controlling sea lice infestations there is a need for new products and this is part of PHARMAQ’s strategic R&D programme.

Through 2009 PHARMAQ maintained its high level of R&D activities and a wide project portfolio was brought forward and several critical milestones were reached. Close to 22% of total revenues were reinvested in research and development in 2009 enabling the company to continue introducing high quality health products to the global fish farming industry.

### Global figures of vaccinated salmonids in sea water farming

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<th>PHARMAQ million doses</th>
<th>Total million doses</th>
<th>Market share</th>
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<tr>
<td>2005</td>
<td>144</td>
<td>403</td>
<td>36%</td>
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<tr>
<td>2006</td>
<td>239</td>
<td>542</td>
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<td>2007</td>
<td>276</td>
<td>624</td>
<td>44%</td>
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<td>2008</td>
<td>278</td>
<td>618</td>
<td>45%</td>
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<tr>
<td>2009</td>
<td>260</td>
<td>595</td>
<td>44%</td>
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Source: PHARMAQstatistics
It's our business to provide environmentally sound, safe and efficacious health products for the global aquaculture industry. Underpinning this is a story of the PHARMAQ value chain, a story including dedicated people and targeted research.

PHARMAQ takes the advantage of operating in a complete value chain from collection of fish pathogens through to the development, manufacture and licensing of fish health products. The activities of our Research and Development organisation are a key driver of the value chain. However, behind every new PHARMAQ product there is an iterative process across the company including the combination of broad and specialized competencies.

In global fish farming major diseases are often caused by bacteria or virus infections. The development of safe and efficacious fish vaccines provides a powerful fish health management tool in the fight against bacterial and viral diseases. In this context our researchers in the Bacterial Technology Group play an important role in the development of new bacterial vaccines. Working within the area of aquatic bacteriology, the group receives samples from diseased fish world wide, and these are included in PHARMAQ's fast growing bacterial isolate collection.

Different bacteria have separate requirements for optimal growth. Bacterial pathogens are identified and characterized with a variety of methods from classical biochemical procedures to molecular biology and gene sequencing.

Optimal conditions for the cultivation of bacteria and development of production processes of different protective antigens are core activities of the Bacterial Technology Group. In 2009 the group successfully contributed to the development of a vaccine against the bacteria *Flavobacterium psychrophilum*. Infections with this bacteria represent a major challenge in global trout farming and PHARMAQ's breakthrough is an important first step in the control of this disease.

The R&D organization is divided into departments covering all aspects needed to develop vaccines and therapeutics against fish diseases:

- Bacterial Technology
- Virus Technology
- Formulation Technology
- Clinical Research
- Regulatory Affairs
- Virus Manufacturing Support
- Intellectual Property Rights
Focusing on another area of the PHARMAQ value chain, The Formulation Technology Group is responsible for the company’s formulation development.

PHARMAQ has extensive experience and broad competence in the formulation of vaccines and therapeutics for the aquaculture industry. The well known vaccine series, ALPHA JECT®, is an example of a successful formulation concept. In these products, the active ingredients are inactivated viral and bacterial cultures.

However, these vaccines also contain a special oil-based adjuvant, which has proven to be essential for satisfactory protection against certain diseases in cultured fish. For instance, it was not until the introduction of PHARMAQ’s oil-based adjuvant in the early 1990’s that it was possible to introduce an effective vaccine against the bacterial disease furunculosis in salmon.

Recently, PHARMAQ has launched the new ALPHA JECT micro® product range, where the administered vaccine dose is reduced by 50%. These products demonstrate an even better side-effect profile, whilst retaining excellent immunological protection.

Another example of a successful formulation is ALPHA MAX®, a therapeutic used for sea lice treatment, containing the active ingredient deltamethrin.

In order to be effective, deltamethrin must be homogenously distributed in sea water. However, deltamethrin is practically insoluble in water. Therefore, the excipients in the ALPHA MAX® formulation have been carefully selected to increase the water compatibility of deltamethrin, and thereby making the product completely miscible with water.

What is Formulation?
Formulation is a field within pharmaceutical science which focus on the design and preparation of the medicinal products’ final composition, to ensure its required biological effect and product stability.

Medicinal products are composed of active ingredient(s) and various substances added to obtain the required product properties. These “helping” substances (or excipients) serve numerous functions and are most often crucial to the proper function of the final product.

In vaccines, an excipient called adjuvant is usually added in order to increase the product’s immunological effect. The word “adjuvant” comes from the Latin word adjuvare, meaning to help or aid.
The PHARMAQ clinical and customer teams and network of distributors in all markets keep a continuous focus on customer service, technical support and product performance. Close co-operation with fish farmers, veterinarians and other involved partners serves a mutual interest in further growing the environmentally sound and healthy global aquaculture industry.

On a daily basis our teams are involved in a variety of field activities. This varies from routine follow-up of vaccination with our products, documentation of product performance both at fresh- and seawater sites and in field trials, through to organising and participating in conferences and meetings.

Besides PHARMAQ’s broad base of internal research and development projects the company is engaged in several customer related projects and externally founded projects. The results arriving from these activities are fundamental to introducing new health products and solutions to the global aquaculture industry. Some of the externally founded projects running in 2009:

- Indo-Norwegian platform on fish and shellfish vaccine Development Havbruksprogrammet 183205/S40 (2008-2011)
- Bilateral cooperation on fish vaccine development for Chinese aquaculture BILAT 190339 (2009)
- Immunity of Aquatic Animals - IMAQUANIM 22 partners in Europe, including NVH, NFH and PHARMAQ (2005-2010)
- Heart and Skeletal Muscle Inflammation (HSMI) - molecular characterisation of the virus and vaccine development Fuge 176975. Two partners, including PHARMAQ (2006-2009).
- Characterization of Francisella piscicida infection in Atlantic cod cells MABIT. Two partners, including PHARMAQ (2009)
- Training in connection with establishment NORAD (2009-2011)
Key elements of PHARMAQ strategy include:
- to be a global provider of fish health products, focusing on vaccines, parasiticides, and fungicides
- to further strengthen our portfolio of vaccines for farmed fish
- expand to new species in Asia and Latin America
- supply vaccines and fish health products through our own subsidiaries or selected distributors
- cooperate with key research institutes
- investigate new business opportunities by licenses, alliances, and acquisitions
INJECTION VACCINES
Cost/benefit analyses for our vaccines show excellent results measured in improved fish health.

DIP/IMMERSION VACCINES
Our dip/immersion vaccines are particularly well suited for the early phases of marine fish species, when protection against diseases is critical.

IMMUNOSUPPORT
Our natural immunosupport product strengthens the fish’s own defence mechanisms.

THERAPEUTIC MEDICINES
Effective delousing agent and antibiotics are supplied when treatment is necessary and anaesthetics are supplied for use with vaccination.

BIOCIDES
Our disinfectants safeguard hygiene throughout the fish farming value chain from egg to finished product.

product groups and major brands

major brands

ALPHA JECT micro®
ALPHA JECT®
ALPHA MARINE®
ALPHA DIP®
VETREGARD®
ALPHA MAX®
PHARMAQ MS 222®
AQUATET®
VETREMOX® fish
HALAMID
PHARMAQ AS is the world’s leading pharmaceutical company supplying the aquaculture industry. The company provides environmentally sound, safe and efficacious health products for the global aquaculture industry through targeted research and the commitment of dedicated people. The vaccines are manufactured in a state-of-the-art production facility in Overhalla in Nord-Trøndelag, Norway. Administration and research and development activities are based in Oslo. With subsidiaries in Chile, United Kingdom and a representative office in Vietnam, PHARMAQ has around 120 employees. The company’s products are marketed in Europe, North and South America and Asia. PHARMAQ’s majority shareholders are Orkla and the investment company Kverva. The management and employees hold a considerable stake in the company. For further information, please visit our website: www.pharmaq.no