



South East Fishery
Industry Development Subprogram

Assessing the Commercial Viability of Utilising Fish Processing Wastes

Ian A. Knuckey

2004



SEAFOOD SERVICES
AUSTRALIA

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**Fisheries Research and
Development Corporation**



**Fisheries Research and Development Corporation
Seafood Services Australia Pty Ltd**

**South East Fishery Industry Development Subprogram:
Assessing the Commercial Viability of Utilising Fish Processing Wastes**

Ian A. Knuckey

**Fishwell Consulting
22 Bridge St Queenscliff VIC, Australia.**

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2002 / 405**South East Fishery Industry Development
Subprogram: Assessing the Commercial Viability of
Utilising Fish Processing Wastes.****PRINCIPAL INVESTIGATOR:****Dr. Ian A. Knuckey****ADDRESS:****Fishwell Consulting****22 Bridge St Queenscliff VIC 3225****Telephone: 03 5258 4399 Fax: 03 5258 4399****OBJECTIVES:**

1. Engage with a range of seafood companies that may have an interest in ASCo's goal of adding value to the seafood supply chain through utilisation of waste fish products;
2. Develop an agreed structure for the fish waste utilisation company that meets the needs of entire supply chain;
3. Develop a business plan for a fish waste utilisation company that includes a feasibility/economic analysis and a marketing plan.

NON-TECHNICAL SUMMARY:

Within the Australian Seafood industry, thousands of tonnes of fish waste are produced by processors and retailers each year. Generally only the fillets are retained and the bulk (~60%) of the product is discarded, often at a cost to the processor and ending up as little more than land-fill. This practice is coming under increased scrutiny due to environmental issues and is becoming an increasing cost burden for the whole industry. Across the seafood industry in south eastern Australia alone, there is an estimate that well over 20,000t of fish product waste is produced each year.

Through the work of FRDC's SEF Industry Development Subprogram to tackle this issue, a group of key stakeholders in the seafood industry formed Australian Seafood Co-products (ASCo: ACN 100 489 236). The mission of the company is to add value to the seafood supply chain through the sustainable utilisation of fish and fish co-products that are not traditionally utilised or marketed. ASCo has 17 seafood companies as shareholders spanning the five south eastern Australian states. A shareholder's agreement is now in place and the company directors have now been elected.

ASCo considered a range of options for the utilisation of seafood waste. Given the relatively wide geographical area covered by Australia's seafood industry and the large variability in the amount and composition of species involved, it was agreed that processing the waste into a valuable organic fertiliser was the most suitable option for ASCo at this point in time. With this goal in mind ASCo went into partnership with Sieber, a New Zealand fertiliser company with proven fertiliser technology, technical backup, and partnerships with other established fertiliser companies and the agricultural industry. Sieber already had a range of fish-based fertiliser products in New Zealand with proven benefits to agricultural crops and certification for use in the rapidly growing organic (farming) market. ASCo established a formal partnership with Sieber by forming a subsidiary company - ASCo Fertilisers (ACN 102 280 115), of which Sieber has a 33% shareholding based on their knowledge and intellectual property.

Each of the ASCo shareholders put forward \$5000, raising a total of \$85K which has been used to leverage over \$800,000 from a variety of government agencies to support the projects needed to get the company off the ground. Different aspects of the project are being funded by different agencies. In NSW, ASCo shareholders have obtained \$23K from the EPA's "Profiting from Cleaner Production Industry Partnership Program" to investigate the feasibility of installing a fish processing plant at the Sydney Fish Market. The Fisheries Research and Development Corporation and Natural Resources and Environment (Victoria) are funding a \$755K project of scientific trials of the seafood-based fertiliser on tomatoes, pasture and crops. ASCo has received \$30K from Seafood Services Australia's Seafood Industry Development Fund and \$24K from Victoria's Department of Innovation, Industry and Regional Development to employ a business consultant to engage with seafood companies interested in ASCo, develop an agreed structure for the operation of ASCo, undertake a feasibility study and develop a business plan. This work is the focus of the current report.

The feasibility study of installing a fish silage processing plant at Sydney Fish Market was completed by Gordon Pender and Associates (June 2003). The report found that the project was attractive from both an environmental and financial point of view and provided a solution to the stringent waste disposal regulations that are currently being implemented. Under almost all scenarios, the installation and operation of a fish silage plant provided a sound annual pre-tax return on investment. Major risk to the viability and safety of the project were considered to be low and manageable.

Wayne Street from Street Ryan and Associates carried out the feasibility study for ASCo and prepared a business plan for the ASCo network. A summary of the outcomes from this work are provided below.

Biological farming is a rapidly growing sector of Australian agriculture that promotes environmental responsibility and sustainable farming practices. The ASCo network company and the joint venture company (ASCo Fertilisers), present an excellent opportunity to convert an unused waste into a valuable composted rock-phosphate fertiliser product (Fish-P), which will support biological farming practices. The fertiliser trials conducted to date in Australia have had positive results and suggest that the product will have commercial application in both irrigated and dryland Australian farming situations. Fish-P has a range of competitive strengths, including strong price competitiveness (compared to superphosphate) cost-effective concentrations of phosphorous, organic certification and environmental sustainability and beneficial soil microbial action.

The ASCo network development has been supported by the formation of a company together with shareholders agreements, which are now completed. The joint venture terms with technology supplier and intellectual property owner Sieber, have been secured and a license agreement has been completed. Financial projections suggest that the venture is not only viable, but is an attractive investment.

A suitable alliance with an Australian based fertiliser manufacturer is now a critical success factor associated with the venture. ASCo needs a firm agreement with a fertiliser manufacturer to manufacture and market at least 20,000 tonnes of Fish-P per year. Potential manufacturing venture partners considered were Resource Care, Incitec Pivot and Impact Fertilisers. Serious negotiations are in progress with Australia's largest fertiliser company Incitec Pivot and ASCoF is now in the final stages of developing a MOU with Incitec Pivot. In this MOU, ASCoF and Incitec Pivot seek to leverage their combined intellectual property and operational capacity to create significant business opportunities through the commercialisation and marketing of a fertiliser product produced from fish wastes. It is the intent of the Incitec Pivot / ASCoF joint development and marketing venture to show that Fish-P and derivative products are as effective as conventional phosphatic pasture products in field trials and can be economically manufactured and distributed in Australia. Commercial trials and market feasibility studies are now being conducted by the joint venture team.

Another critical stage for ASCo is the construction of fish processing plants and beginning commercial production. Following discussion of the business plan it was agreed that ASCo shareholders will be invited to own and operate liquid fish nutrient plants, under an agreement with ASCo. It is recognised by ASCo that under this business structure there is potential for internal conflicts between ASCo and those shareholders that intend to operate a plant. The main issue is defining the level of return that goes to the plant operator which obviously impacts on the potential returns that are available to ASCo members through their 67% shareholding in ASCoF. It was agreed that members operating a plant should achieve an appropriate commercial return from constructing and operating liquid fish nutrient plants. ASCoF will invite ASCo members to consider constructing and operating a plant on a case-by-case basis depending on product demand and the economic feasibility of plant operation. A draft ASCoF / plant operator contract is currently being drawn up.

Although the potential for a joint venture with Incitec Pivot is encouraging, the final decision to produce and market Fish-P is dependent on the results of their own trials and market testing of the product. In the meantime, ASCo members are looking to utilise their waste fish products and a number of options for sale of product to individual agricultural companies or co-operatives are being considered. This is being done to maintain cash-flow and bring in some returns to ASCo to cover basic administration and running costs. We have also obtained some government funding through the National Food Industry Strategy to assist in the network development between ASCoF and Incitec Pivot.

OUTCOMES ACHIEVED TO DATE:

- Development and support of new technologies and improved utilisation to add value to the SEF seafood supply chain
- Establishment of Australian Seafood Co-products and significant progress towards the commercial utilisation of bulk seafood wastes across south eastern Australia

KEYWORDS: South East Fishery, value-adding, waste utilisation, fertilisers, biological farming.

ACKNOWLEDGEMENTS

I gratefully acknowledge the people and organisations that have helped and funded various aspects of ASCo's development including: Ted Loveday and Jayne Gallagher from Seafood Services Australia and the Seafood Industry Development Fund, Bruce Green and Victoria's Department of Innovation, Industry and Regional Development, Peter Dundas-Smith, John Wilson and Crispian Ashby from the Fisheries Research and Development Corporation, NSW EPA's Profiting from Cleaner Production Industry Partnership Program, Dr Aravind Surapaneni and Victoria's Department of Primary Industry, and David Gregory and Andrew Combe from the National Food Industry Strategy.

Special thanks to Gordon Pender for undertaking the plant feasibility project and Wayne Street of Street Ryan and Associates for all of the work and support he has provided for the initiation of ASCo. Thanks also to Terry Moran and Steve Buckless from SETFIA, John Roach and Michael Kitchener from Master Fish Merchants Association, Grahame Turk from the Sydney Fish Market, Malcolm McLaughlin from Consolfish, Clive Sinclair, James Mace and Hans-Peter Weidmann from Sieber Australia Limited.

Charlie Walker from Incitec-Pivot has played a key role in the development and business planning for ASCo. His assistance during the initial stages of product development, field trials, commercialisation and market development have been crucial to the success of ASCo to date, and I appreciate his willingness to work closely with ASCo in its development of a business partnership and MOU with Incitec Pivot.

BACKGROUND

Within the Australian Seafood industry, thousands of tonnes of fish waste are produced by processors and retailers each year. In the processing sector, it is generally only the fillets that are retained, while the bulk (~60%) of the product is discarded, often at a cost to the processor and ending up as little more than land-fill. Across the industry in south eastern Australia alone, there are estimates that probably well over 20,000t of fish product waste is produced each year. If this waste could be utilised, it would bring millions of dollars into Australia's seafood industry.

At the 2001 Seafood Direction Conference, ASIC highlighted that the utilisation of fish waste was one of the high priority areas that needed to be addressed in the next two years. In addition, under Environment Australia's eco-efficiency agreements, the Master Fish Merchant's Association has recognised waste utilisation as a high priority for its members.

In October 2001, the SEF Industry Development Subprogram held a one-day workshop to discuss ways to improve the utilisation of fish waste by investigating techniques to process the waste into products such as aquaculture feeds, silage, fertilisers, fish mince, and fishmeal. After discussing a variety of options, it was agreed that processing the waste into a valuable organic fertiliser was the option that was most feasible at that point in time. This option suited the particular characteristics of the processors and the raw product that they produce: it could utilise the bulk of the fish waste and prove cost-effective given the relatively low volume and wide geographical area covered by Australia's seafood industry.

Although different individuals and companies have tackled their waste problems with varying degrees of success, the problem still exists on a large scale throughout the seafood industry. It was acknowledged that if the utilisation of fish waste was to be successful on a broad scale, it would require a considerable level of coordination and cooperation, both within the industry supply chain and across a range of different areas.

The concept explored at the workshop was whether a company could be formed that would:

- foster large-scale cooperation across the whole of supply chain;
- promote sensible use of the current resources and infrastructure of the seafood industry towards waste utilisation;
- encourage investment into waste utilisation and product marketing; and,

- consider investing some of the profits from waste utilisation towards the strategic, long-term issues facing the cooperative members.

A lot of progress has been made since that workshop. A group of key stakeholders in the seafood industry has formed a company, Australian Seafood Co-products (ASCo: ACN 100 489 236), to coordinate and progress the utilisation of waste fish products. The aim of the company is to add value to the seafood supply chain through the sustainable utilisation of fish and fish co-products that are not traditionally utilised or marketed.

One of the first tasks of ASCo was to develop a partnership with a company that had the technology and experience process fish wastes into organic fertilisers. Two companies were approached (VITEC and Sieber), with the latter proving to be the most appropriate. Subsequently, ASCo employed a business and management consultant to undertake due diligence of Sieber and report on the potential for a partnership between ASCo and Sieber. The report revealed that although Sieber were not a large company with extensive capital or profits, they were a reputable company that would bring several benefits to ASCo, including access to proven fertiliser technology, technical backup, and partnerships with established fertiliser companies. Importantly, it revealed that Sieber had a range of fish-based fertiliser products that have proven benefits to agricultural crops and have also been certified for use in the rapidly growing organic (farming) market.

In the current project we sought funds to conduct a feasibility study and develop a business plan and marketing strategy for ASCo.

NEED

With most of Australia's fish stocks near or at full exploitation, it is unlikely that the industry will expand and develop through increased wild-capture harvests. One of the main options for increased profits to the seafood industry is through value-adding the current catch. Despite this, Australia's seafood industry is throwing away tens of thousands of tonnes of fish waste each year, potentially worth many of millions of dollars. Why? The wastes are produced at low levels across hundreds of different shops, processors and markets around Australia and economies of scale prevent any one of these waste producers solving the problem for themselves, much less the whole industry. As a result, most seafood waste is discarded – bringing no return back to the industry much of it going to landfill at costs up to \$150/tonne. This practice is coming under increased scrutiny due to environmental

issues and is therefore becoming an increasing cost burden for the whole industry. The solution lies in a broad-scale coordinated and collaborative, multi-jurisdictional approach across the different sectors of the seafood industry supply chain. By forming ASCo, industry members (catching, processing, wholesalers and retailers) from three different states have already agreed in principle to this goal and have committed funds to achieving it. The initial stages of structuring the company, developing a business plan and conducting a feasibility analysis will require extensive stakeholder input and collaboration. This proposal was submitted to Seafood Services Australia's Seafood Industry Development Fund (SIDF) to obtain funds alongside ASCo shareholders contributions to help ASCo get through these initial stages.

OBJECTIVES

1. Engage with a range of seafood companies that may have an interest in ASCo's goal of adding value to the seafood supply chain through utilisation of waste fish products;
2. Develop an agreed structure for the fish waste utilisation company that meets the needs of entire supply chain;
3. Develop a business plan for a fish waste utilisation company that includes a feasibility/economic analysis and a marketing plan.

METHODS

There are a variety of benefits of adopting a whole of supply chain approach to waste utilisation in the seafood industry and applying it across a broad range of areas and fisheries. One of the most important of these, is that it provides a mechanism for the seafood industry to work together to resolve an issue with a solution that can financially benefit all involved. If there is not a coordinated, collaborative approach, economies of scale will be lost and the value of the end product will be reduced because the end users rather than the producers will determine returns. Currently fish waste is usually taken away at a cost to industry of up to \$150/tonne and put to landfill or taken free of charge by companies that then profit from processing that waste. There is, therefore, a large financial incentive for the seafood industry to try and work together on this project. Furthermore, with increasing ecological and sustainability pressures coming on the industry, the time is right to tackle the

issue of reducing fish waste. The problem is however – getting collaboration and cooperation across diverse regions and sectors of the seafood industry.

As an encouraging first step, there was commitment from some sectors of the seafood industry across south eastern Australia (Sydney and Melbourne Fish Markets, various processors, the Master Fish Merchants and SETFIA) to this collaborative effort. Through the efforts of the SEF Industry Development Subprogram, ASCo was formed and these companies/associations have committed funds to become initial shareholders of the company.

Using shareholder capital together with SIDF funds, ASCo intends to achieve the objectives of the project through the following methods:

Objective 1 Engage with a range of interested seafood companies.

ASCo is being set up to be inclusive of a large number of seafood companies across a broad regional base (all of south-eastern Australia). It is important that information about ASCo is distributed across the industry and companies that produce significant amounts of seafood waste are given the opportunity to participate. There are going to be significant initial costs in bringing all interested parties together at meetings where they can be briefed on the progress of ASCo and help determine ASCo's future direction. Meetings will be held at Melbourne, Sydney and other major regional centres to discuss and determine the direction of ASCo.

Objective 2 Develop an agreed structure for ASCo

There will be a number of competing interests within the company depending on how the company is structured. For example, waste producers will be expecting to get paid as much as possible for the supply of fish wastes, while those operating a processing plant would have greater capital outlay and would hope to offset these costs through minimising purchase costs and maximising sales and profits. Partnership with any fertiliser company will add further complexity to these competing interests. There will need to be extensive discussion to obtain a structure for the company that satisfies these competing needs in an equitable manner.

Objective 3 Conduct a Feasibility study and develop a business plan and for ASCo

Whilst the perception of a project to turn fish waste into profits for the seafood industry is very attractive, the economic viability of the utilisation of fish as raw product for organic fertilisers needs to be determined. Similar projects set up overseas have been successful and yielded profits, but these

are often in larger fisheries with more centralised production. A good model for such an operation is provided by Sieber Fertilisers in New Zealand, but a dedicated study of the transfer of such an arrangement to the Australian situation is required. To this end we will develop a “network business plan” focussing on market, operational, and financial plans and strategies for the new venture. This would include support in project management and discussions with fertiliser companies, farm consultants and major growers. The tasks in this stage of the project would be to: commence discussions with an Australian fertiliser company as a market and distribution alliance partner; contact vegetable growers in Werribee and other areas, to begin trials and tests of fertiliser products; liaise with the network of farm consultants in Victoria, WA, Queensland and New South Wales to obtain their involvement and make arrangements for future supply to their clients; and, commence action for implementing field trials on crops in time for the next sowing season. To facilitate the above objectives, ASCo has requested two external business and management consultants (Street Ryan and Laney Pickett & Associates) to provide proposals to assist in this process. Based on their presentations, one of these consultants will be selected to facilitate this process. It is considered that a third-party consultant would be extremely useful as they can remove themselves from the potential competing interests within the company. In addition to the funds from SIDF, we have succeeded in obtaining Victorian Department of Innovation, Industry and Regional Development support for the employment of a consultant to undertake this work.

RESULTS / DISCUSSION

Objective 1 Engage with a range of interested seafood companies.

Through the efforts of the FRDC South East Fishery Industry Development Subprogram, a group of key stakeholders in the seafood industry decided to form Australian Seafood Co-products (ASCo) to add value to the seafood supply chain through the sustainable utilisation of fish and fish co-products that are not traditionally utilised or marketed. The initial shareholders were Sydney fish Markets, Master Fish Merchants Association and South East Trawl Fishing Industry Association. It was recognised that to be successful, ASCo needed to have a broad range of shareholders from the catching and processing industry sectors across south eastern Australia. To this end articles were published in the FRDC R&D News and the NSW Catch magazine seeking companies that were interested in ASCo. Contact was made with over 40 of the larger seafood companies in south eastern Australia and a letter was sent out to those that were likely to be interested in the project (See Appendix 3).

As a result of these contacts, 17 seafood companies spanning the five south eastern Australian states joined as shareholders in ASCo. These included: Angelakis Brothers, Better Choice Fisheries, Capitol Seafoods, Christies Seafoods, De Costi Seafoods, Doyles Seafoods, Fisheries Research and Development Corporation, Flemington Market Seafood Stallholders, George Town Seafoods, McLaughlin Consolidated Fishermen, Musumeci's Seafoods, Master Fish Merchants Association, Morgan's Seafoods, Racovolis Amalgamated Fish Merchants, Raptis & Sons, South East Trawl Fishing Industry Association, and Sydney Fish Market. A shareholder's agreement was drawn up and is now in place. The elected company directors are Grahame Turk, Malcolm McLaughlin, John Roach, Steve Buckless and Ian Knuckey.

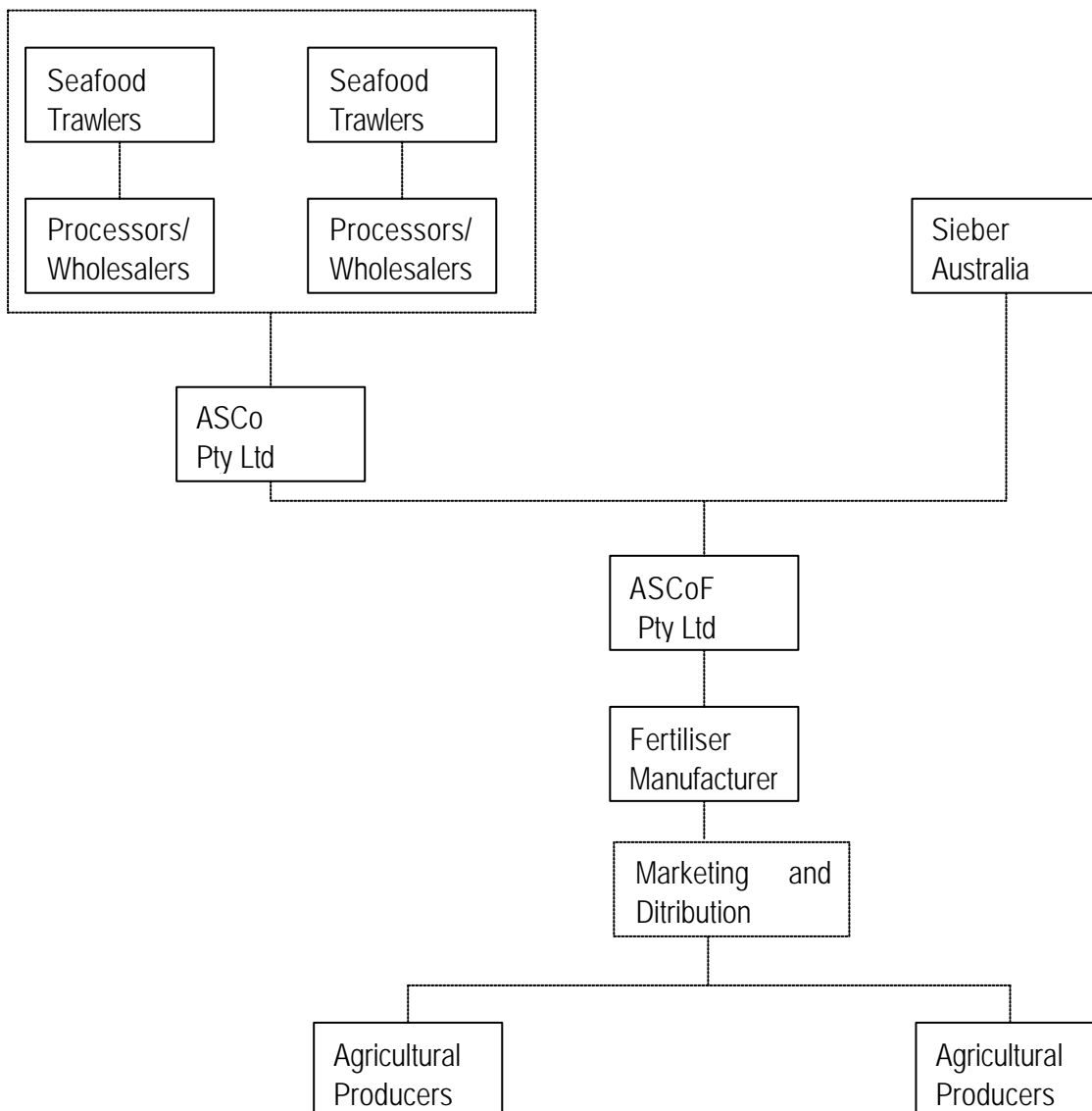
Numerous meetings have taken place in order to get ASCo up and running and to progress the utilisation of fish wastes. A summary of the ASCo meetings is provided at Appendix 4.

Objective 2 Develop an agreed structure for ASCo

Within ASCo there are a variety of shareholders involved in different aspects of the SEF industry supply chain from the catching, processing and retail sectors. ASCo has established a formal partnership with Sieber by forming a subsidiary company - ASCo Fertilisers (ASCoF), of which Sieber has a 33% shareholding. Sieber is a New Zealand fertiliser company with proven fertiliser technology, technical backup, and a range of fish-based fertiliser products in New Zealand that have proven benefits to agricultural crops. It was agreed that the operational aspects of this venture will work through ASCoF, with ASCo remaining as a shelf company to encompass Australia's seafood industry members. ASCoF shareholders have recognised that there are a number of potential ways in which the company could operate the processing plants and distribute the profits within the ASCo/F framework. That there would be internal differences of opinion between ASCo shareholders that do and do not operate a plant necessitated decisions about the ASCo/F structure were transparent and facilitated by an independent party. It was agreed that Wayne Street would be able to act as that facilitator in his role to develop the business plan and networks to support ASCo/F. Mr Street was asked to develop some options to help progress this aspect of ASCo from two starting positions: a) a set return on investment for shareholders operating a plant (eg. 25%) and the rest returning through ASCoF and b) a given return to ASCoF with the remainder (+ costs) going to the plant operators. He was also asked to consider whether it was more appropriate for the returns to be apportioned by % or a dollar value. The options regarding whether the plants should be owned by ASCo or by any of the individual company shareholders also required further

investigation although it was generally agreed by shareholders that the day-to-day operation of the plants would best be undertaken by the companies at which the plants were based. In outlining the operational structure of ASCo, Dr Knuckey stressed the need for some return to be directed to the original waste producers (even if they were not shareholders) to provide some incentive for the entire seafood supply chain to be involved and get some value out of the venture – not just the shareholders of ASCo/F. Shareholders agreed to this underlying principal but acknowledged that the venture would need to be making a profit in the first place for this to occur.

Details of the various options considered by ASCo are provided in the Business Plan at Appendix 7. Ultimately it was agreed that ASCo shareholders will be invited to own and operate liquid fish nutrient plants under a purchase agreement with ASCo. Liquid fish nutrient would be purchased by ASCo at a price that would ensure commercial returns on investment by the plant operators. Profits from the sale of nutrient to ASCoF would be returned to the shareholders. The structure of the ASCo/F network and supply chain is provided below.



Each of the ASCo shareholders put forward \$5000, raising a total of \$85K which has been used to leverage over \$800,000 from a variety of government agencies to support the projects needed to get the company off the ground. Different aspects of the project are being funded by different agencies. ASCo has received \$30K from Seafood Services Australia's Seafood Industry Development Fund and \$24K from Victoria's Department of Innovation, Industry and Regional Development to employ a business consultant to engage with seafood companies interested in ASCo, develop an agreed structure for the operation of ASCo, undertake a feasibility study and develop a business plan. In NSW, an ASCo shareholder (Master Fish Merchants Association) obtained \$23K from the EPA's "Profiting from Cleaner Production Industry Partnership Program" to investigate the feasibility of installing a fish processing plant at the Sydney Fish Market. The Fisheries Research and Development Corporation and Natural Resources and Environment (Victoria) are funding a \$755K project of scientific trials of the seafood-based fertiliser on tomatoes, pasture and crops.

Objective 3 Conduct a Feasibility study and develop a business plan and for ASCo

Much of the work ASCo has commissioned over the last year has centred on the feasibility of the project and development of a business plan. The results of this work are summarised below.

Feasibility of installing and operating a fish silage plant at Sydney Fish Market

Gordon Pender and Associates conducted a feasibility analysis of the installation of a fish silage plant at Sydney Fish Market. The conclusions of the feasibility study were that the project was attractive from an environmental and financial point of view. Better solutions to the current problem of fish waste disposal were required, both to deal with the existing situation at the markets, and to address the likelihood of more stringent regulation in the future. The process selected (production of fish silage for use in composted rock phosphate fertilisers) appears likely to provide this solution.

The financial basis for the project is straightforward and positive. It depends on contracted sale of the product at prices in excess of the cost of production. Financial modelling estimates the process is financially viable. Various assumptions on the payment to suppliers of fish waste and charging clients for transport and storage of waste generated are included. It is assumed that freight ex-market will be paid by the customer. Freight rates for bulk tanker loads of 22 tonnes within about 100 km of SFM are likely to cost about 3 cents a litre. Major risks to the viability and safety of the project appear low and manageable.

ASCo Feasibility and Business Plan

At the ASCo meeting on September 11 2002, two business consultants were invited to present their individual proposals to conduct a feasibility study and business plan for ASCo. Both presentations were of a high quality and the meeting participants believed that either company could adequately undertake the work. After due consideration, it was decided that Street Ryan had the better proposal. This decision was largely influenced by Street Ryan's expertise and previous experience in agri-business projects and the potential benefits that this could have for the ASCo project. They were able to be more specific about the people that could be valuable for networks in the value chain approach that we are adopting.

Subsequently, Wayne Street has attended most ASCo meetings and has been in regular contact with various ASCo directors. The ASCo feasibility study and development of the business plan was completed in July 2003. Below is an excerpt from the Executive summary of Street Ryan's Business Network Plan for ASCo. Note: the product "BioPhos" referred to below is the tradename for the Fish-P product developed in New Zealand by Sieber.

Biological farming is a rapidly growing sector of Australian agriculture. It promotes environmental responsibility and sustainable farming practices. However, the volumes required for the BioPhos venture to be attractive suggest that it would be important to have mainstream farming markets.

The ASCo network company and the joint venture company with Sieber (ASCoF), present an excellent opportunity to convert an unused waste product into a productive and profitable seafood industry co-product which will support biological farming practices.

The BioPhos trials conducted to date in Australia have had positive results and suggest that the ASCoF fertiliser products will have commercial application in both irrigated and dryland Australian farming situations.

BioPhos has a range of competitive strengths, such as

- strong price competitiveness (including the ability to offer good margins to a national dealer/merchandiser network)
- cost-effective concentrations of phosphorous
- organic certification and environmental sustainability
- beneficial soil microbial action

The venture has taken somewhat longer to develop than anticipated, at conception, and implementation now needs to be fast tracked to capitalise on opportunities. However, there is a need for the venture to be “driven” by ASCo to a greater extent than expected.

The ASCo network development has been supported by the formation of a company together with shareholders agreements, which are nearing finalisation.

The joint venture terms with technology supplier and intellectual property owner Sieber, have been secured. A license agreement has been drafted.

Financial projections suggest that the venture is not only viable, but is an attractive investment under a range of scenarios, including

- ASCoF owning and operating the liquid BioPhos processing plants
- Individual ASCo shareholders owning and operating the liquid BioPhos processing plants
- Contracting out the liquid BioPhos processing plants function.

A supply relationship with Resource Care/IQ Ag would be sensible. However this company is unlikely to be a major manufacturer of solid fertiliser products within the next 2 – 3 years. The two improved manufacturing facilities of IQ Ag will process up to 2,500 tonnes of liquid fish nutrient at full production.

There is no merit in proceeding with the installation of a fish nutrient processing plant at the premises of one or more ASCo members until there are firm arrangements in place for the supply of liquid fish nutrient. In addition, it would be preferable to have a firm agreement with a fertiliser manufacturer to produce and market at least 20,000 tonnes of BioPhos per annum. ASCo and ASCoF could enhance the prospects of such an agreement by offering to be involved in the manufacturing venture as a joint venture partner (perhaps in cooperation with Phosphate Resources). Manufacturing venture partners could be

- Resource Care (who could only become solid fertiliser manufacturers by a joint venture arrangement)
- Incitec Pivot, pending negotiations
- Impact Fertilisers, pending negotiations.

Financial projections suggest that, in order to process 18,000 tonnes of seafood waste; there would need to be markets for 120,000 tonnes of BioPhos and 12,000 tonnes of liquid fertiliser. This would be a sizable proportion of Australia's fertiliser market.

Next Steps and Strategic Issues for Resolution

The incorporation of all entities and the enactment of agreements and memoranda of understanding need to be completed.

A suitable alliance with an Australian based fertiliser manufacturer is now the critical success factor associated with the venture. Negotiations are proceeding with the Independent Quality Resources (IQR) group, which is a consortium in the biological agribusiness sector, and some discussions have been held with other fertiliser manufacturers. Clearly, the liquid BioPhos produced by ASCoF needs to be input into a final product by a committed manufacturer, with established agricultural markets and distribution systems.

The location, staging of implementation and the ownership of liquid nutrient and BioPhos processing plants needs to be finalised and agreed by ASCoF stakeholders. Options include

- ASCoF owning and operating the plants
- Individual ASCo shareholders plants
- Contracting out the processing function
- Joint ventures.

Irrespective of the preferred strategy, from the above, the commercialisation of the chain is unlikely to proceed rapidly without strong input from ASCo. There is no doubt that the members of ASCo are the most financially sound and most significant businesses in the supply chain to date. Unless ASCo provides resources or facilitation to further develop the chain, there is a low probability that the venture will proceed to commercialisation in the short term.

BENEFITS AND ADOPTION

One of the most critical aspects for the success of this project was the development of a business network that enabled the waste from the seafood industry supply chain to be recognised and established as a valuable resource through the application of appropriate technology. Success was made more difficult because of the tendency for different sectors of the seafood industry to work in isolation (both regionally, and across the supply chain). Further difficulties were associated with the fact that the end product had value to an industry sector well outside the normal sphere of the seafood industry. Thus, the feasibility of the project depended on innovative linking of business partners within the seafood industry and between the seafood and agriculture industries. Through

this project, these partners have been identified and brought together into a network that has potential benefits to all involved. The full extent of these benefits will not be realised until a few years into the future when ASCo is achieving significant levels of waste utilisation and bringing financial returns back to the seafood industry. In doing so, the present costs to the seafood industry in the disposal of fish wastes (anything up to \$150/tonne) will be replaced by returns from waste utilisation of up to \$800/tonne. This is the starting point of bringing many millions of dollars back into the seafood industry each year.

The adoption of the concept of the project is evident in the range of Australian seafood companies involved in ASCo. As mentioned previously, never before has such a large range of companies and associations from Australia's seafood industry come together in a company for the mutual benefit of through-chain partners in Australia's seafood industry. Other evidence of the adoption of results of the project is in the fact that Australia's largest fertiliser company – Incitec-Pivot – is willing to enter into a Memorandum of Understanding with ASCo Fertilisers on the joint intellectual property, commercialisation and marketing of the fish-based solid phosphate fertiliser.

FURTHER DEVELOPMENT

Maintaining ASCo capacity

ASCo and ASCoF are two new seafood industry network companies with limited capital and no source of income until sales of fish nutrient come on line. The funds that have been used to date to cover operational costs and conduct the feasibility analysis and business plan have been derived from initial shareholder capital and government grants. Given the positive progress over the last year, it is imperative that ASCo maintains the working capacity and resources to continue its development and to achieve its ultimate goals.

To this end ASCo has successfully applied for funding from the National Food Industry Strategy's (NFIS) Food Chain Program to employ a consultant to provide mentor support and chain management assistance to further formalise and develop the relationship between the major chain partners: ASCo, ASCoF, the 16 Seafood Industry businesses, FRDC, Sieber Australia Ltd, and Incitec Pivot Ltd. The ASCo project is viewed by NFIS as a landmark initiative for the seafood industry. It addresses several major NFIS strategy areas, including:

- formation of collaborative supply chains in the food industry;
- value adding and innovative product development;

- adoption of improved environmental management practices.

The project will assist ASCo in steering the chain through its next stages, namely:

- Establishment of liquid fish nutrient plants at selected ASCo shareholders facilities;
- Enactment of ASCoF shareholders agreements;
- Completion and enactment of a Memorandum of Understanding (MOU) between ASCoF and Incitec Pivot;
- Facilitation of the ASCoF/Incitec Pivot joint development team;
- Development of a joint venture or agreement for the manufacture and marketing of Fish-P products;
- Product launch and agreed marketing program.

More details on the major aspects of this work are provided below.

Alliance with Australian Fertiliser Company

A suitable alliance with an Australian based fertiliser manufacturer is now the critical success factor associated with the venture, and serious negotiations are in progress with Australia's largest fertiliser company Incitec Pivot. Clearly, the liquid fish nutrient to be produced by ASCoF needs to be input into a final product by a committed manufacturer, with established agricultural markets and distribution systems. To this end ASCoF is now in the final stages of developing a MOU with Incitec Pivot. In this MOU, ASCoF and Incitec Pivot seek to leverage their combined intellectual property and operational capacity to create significant business opportunities through the commercialisation and marketing of a liquid fish associated fertiliser product. It is intended that a joint development team consisting of technical and commercial representatives from both groups will be formed to define market opportunities and implementing actions to meet those opportunities. A summary of the main points of the MOU are provided below.

The joint development and marketing venture will be determined to be successful if:

- Fish-P and derivative products can be shown to be as effective as conventional phosphatic pasture products in field trials;
- It can be determined that marketable product(s) can be economically manufactured and distributed in Australia; and

- A mutually agreed volume of Fish-P and/or derivative products can be sold to the Australian market place annually, within a certain time period.

Subject to satisfaction of the success factors referred to above, the business to be conducted by ASCoF and Incitec Pivot shall consist of:

- Exclusive rights to Incitec Pivot to market the jointly developed product(s) in Australia;
- Access to the liquid fish nutrient resources of ASCoF with first right of refusal over supply.
- Access to the Incitec Pivot national distribution network.
- Establishment of mutually agreed sales targets for any products developed as part of the program.

The business shall be implemented in the following stages:

- Product field evaluation.
- Establishment of liquid fish nutrient plants by Australian Seafood Co-Products Pty Ltd on an agreed rollout schedule.
- Development of a joint venture or agreement for the manufacture and marketing of Fish-P products.
- Product launch and agreed marketing program.

Establishment of fish processing plants by ASCo shareholders

For ASCoF specifically, the next critical stage is the construction of fish processing plants and beginning commercial production. Following discussion of the business plan it was agreed that ASCo shareholders will be invited to own and operate liquid fish nutrient plants, under a purchase agreement with ASCo.

It was considered that Georgetown Seafoods would be a suitable location for the pilot liquid fish nutrient plant because they already have much of the equipment required, they are in a suitable urban environment and they already produce a form of fish waste as a fertiliser and have a means of distributing this waste.

It is recognised by ASCo that under this business structure there is potential for internal conflicts between ASCo and those shareholders that intend to operate a plant. The main issue is defining the level of return that goes to the plant operator which obviously impacts on the potential returns that are available to ASCo members through their 67% shareholding in ASCoF. It was agreed that

members operating a plant should achieve an appropriate commercial return on investment from the construction and operation of liquid fish nutrient plants, yet pricing needs to allow good a sound return to ASCoF. ASCoF will invite ASCo members to consider constructing and operating a plant on a case-by-case basis depending on product demand and the economic feasibility of plant operation. A draft ASCoF / plant-operator contract is currently being drawn up.

As the potential operators of the pilot ASCo plant, Georgetown Seafoods is progressing the process of implementing a plant on their site. George and Craig Doumouras are considering the above arrangements and will be travelling to New Zealand to observe an operating plant in Auckland. If they agree to go ahead, it is expected that ASCo will have the first plant in operation by late March 2005.

Developing an interim market for liquid fish silage

Although the potential for a joint venture with Incitec Pivot is encouraging, the final decision to produce and market Fish-P is dependent on a number of factors, not the least of which is their own trials and market testing of the product. This may take up to two years. In the meantime, ASCo members are still looking to utilise their waste fish products through production of fish silage. In this respect, ASCo is exploring a number of options for sale of product to individual agricultural companies or co-operatives on a direct basis. There are a couple of interested parties at this stage. This is being done to maintain cash-flow and bring in some returns to ASCo to cover basic administration and running costs. We are also exploring the possibility of obtaining some government funding through the National Food Industry Strategy to assist in the network development between ASCoF and Incitec Pivot. This funding may also relate to the environmental benefits of what ASCo is trying to achieve.

PLANNED OUTCOMES

At its inception, the planned outcomes of the ASCo project were to:

- Add value to seafood products by providing financial incentives to utilise all of the waste product associated with seafood production at the catching, processing and retail level;
- Provide financial benefits for all sectors of the fishing industry as well as the benefit of the seafood industry being able to portray a "clean green" image;

- Drive the utilisation of seafood wastes by commercialising appropriate waste processing techniques and developing markets for the product that turn costly seafood waste into products that will return profit across the seafood industry;
- Incorporation different sectors of the seafood industry supply chain into a single company that works to achieve beneficial outcomes for the entire industry.

Although ASCo is not yet up to the stage of commercial production, the project has gone a long way towards realising these outcomes. The formation of ASCo alone, with the joint partnership of 17 seafood companies from the catching, processing and retail sectors, is good evidence of levels of cooperation and collaboration that this project has helped to foster. Importantly, once sales of Fish-P get underway, financial returns from ASCo project will start to be realised. In doing so, the present costs to the seafood industry in the disposal of fish wastes (anything up to \$150/tonne) will be replaced by beneficial returns from waste utilisation. This is the starting point of bringing many millions of dollars back into the seafood industry each year and achieving all of the initial goals of the project.

Beneficiaries

- The SEF catching sector
- SEF processors and wholesalers
- Those involved in marketing and retailing SEF product
- Consumers of SEF produce
- Suppliers of products and services to the industry
- Those conducting research and management relating to the SEF

CONCLUSION

The concept of Australian Seafood Co-products (ASCo) has attracted the involvement of numerous south eastern Australian seafood industries from across the supply chain. ASCo is an innovative company committed to adding value to the seafood supply chain through the sustainable utilisation of fish and fish co-products that are not traditionally utilised or marketed. In undertaking this project, ASCo shareholders have progressed towards this goal by conducting a feasibility study and developing a business plan.

The work undertaken in this project has revealed that the installation and operation of a fish silage plant can provide a sound pre-tax return on investment, and risks to the viability and safety of the project were low and manageable. Through entering into a joint venture with Sieber, ASCo has linked up to a partner with proven fertiliser technology, technical backup, and an established range of fish-based fertiliser products. By processing fish wastes into liquid fish nutrient which can be manufactured into a valuable composted rock-phosphate fertiliser product, ASCo has found commercially viable means of utilising waste products and bringing returns back into the seafood industry. Trials of Fish-P have had positive results and suggest that the product will have commercial application in both irrigated and dryland Australian farming situations. Fish-P has a range of competitive strengths, including strong price competitiveness (compared to superphosphate) cost-effective concentrations of phosphorous, organic certification and environmental sustainability and beneficial soil microbial action.

Engaging a consultant with extensive experience in the agriculture industry has provided ASCo with options for business networks that it needs to achieve its goals for the manufacture and marketing of Fish-P. Suitable alliance with an Australian based fertiliser manufacturer is now a critical success factor associated with the venture. To this end we have developed a Memorandum of Understanding with Incitec Pivot – Australia’s largest fertiliser company – to conduct commercial trials and market feasibility studies, thereby achieving all of the objectives of the project. ASCo now needs to begin the construction of fish processing plants and commercial production of liquid fish nutrient. The first plant is expected to be operational within the next six months with interim arrangements in place for the manufacture and sale of Fish-P. Production estimates, sales targets and a firm agreement with Incitec Pivot should be established within this time frame. This will launch ASCoF into its full commercial production phase whereby seafood wastes will be recognised as valuable co-products that are bringing significant returns back into Australia’s seafood industry.

APPENDIX 1 INTELLECTUAL PROPERTY

A number of Intellectual Property issues have arisen in the ASCo project.

The potential for producing a solid phosphate fertiliser from fish wastes involves IP from a New Zealand-based fertiliser company “Sieber”. This company has developed the IP for a solid phosphate fertiliser ‘BioPhos’ that incorporates fish silage. Following the due diligence conducted on Sieber, a Non-disclosure Agreement was signed by the Subprogram leader on behalf of ASCo.

An Intellectual Property Licence agreement has been established between ASCo and Sieber for ASCo Fertilisers. Subsequently, an IP agreement will need to be developed between ASCo Fertilisers and the companies chosen to manufacture Fish-P in Australia. One of the potential manufacturers in Australia is Incitec-Pivot, and a Memorandum of Understanding has been developed between ASCo Fertilisers and this company. FRDC have become shareholders in ASCo along with 16 other seafood companies from south-eastern Australia. As a result of the transfer of IP to ASCo Fertilisers, any royalties from the production and sale of Fish-P will be distributed to the two shareholders in proportion to their equity in the company.

The Intellectual Property Licence Agreement, Feasibility Studies, Business Plan and Memorandum of Understanding produced as part of this project are confidential documents and remain the property of ASCo and its partners.

APPENDIX 2 PROJECT STAFF

Dr Ian Knuckey was the Principal Investigator and coordinated the project and input from various agencies and consultants. Gordon Pender from Gordon Pender and Associates conducted the feasibility study for the installation of a silage plant at the Sydney Fish Market. Wayne Street from Street Ryan and Associates conducted the ASCo feasibility study and prepared the ASCo business plan.

APPENDIX 3

INVITATION FOR POTENTIAL ASCO SHAREHOLDERS



ACN 100 489 236

Ian Knuckey
Fishwell Consulting P/L
22 Bridge St
Queenscliff, VIC 3225
Ph. 03 5258 4399
0408 581 599
Fishwell@datafast.net.au

2 August 2002

Mr John Roach
Master Fish Merchants Association
Locked Bag 247
Pyrmont NSW 2009

Dear Mr Roach

As you know, many thousands of tonnes of fish waste are thrown away from the catching, processing and retail sectors of the seafood industry each year. Not only is this a great cost to industry, but also there are increasing environmental and ecological concerns about this waste disposal.

To address this issue, a number of key stakeholders in the seafood industry have established an 'industry-based' fish waste utilisation company, Australian Seafood Co-products (ASCo; ACN 100 489 236). The aim of the company is to add value to the seafood supply chain through the sustainable utilisation of fish and fish co-products that are not traditionally utilised or marketed. Through the efforts of the Fisheries Research and Development Corporation's SEF Industry Development Subprogram, this project has attracted considerable support from various state and commonwealth government departments. They have committed dollar for dollar matching funds of at least \$55,000 to undertake a feasibility study and develop a business and marketing plan for the company.

Background research has identified that one of the most viable options for fish waste utilisation in south eastern Australia, is the facilitation of through-chain collection of fish waste which would be processed into a value added organic fertiliser and marketed to the commercial horticulture and agriculture sectors. Following preliminary discussions with two companies that have experience in producing fertilisers from fish wastes, ASCo has sought a partnership with Sieber New Zealand Ltd, a company that has undertaken substantial research and development into bio-fertilisers based on fish products. A recent due diligence report revealed that although Sieber are not a large company with extensive capital or profits, they are a reputable company that would bring several benefits to ASCo, including access to proven fertiliser technology, technical backup, and partnerships with established fertiliser companies. Sieber have a range of fish-based fertiliser products that have proven benefits to agricultural crops and have also been certified for use in the rapidly growing organic (farming) market.

Following in principle support by a number of key stakeholders at a meeting in Melbourne on May 3rd 2002, I am writing to confirm your interest in becoming a shareholder in ASCo. The initial, equal shareholdings will be based on receipt of \$5,000 by COB on Friday 30th August, 2002. Similar letters have been sent out to other seafood companies and associations (see list attached) that produce significant amounts of waste that could be processed and marketed through ASCo. These seed funds will be used to match the government funds for conducting a feasibility study and undertaking a business plan and marketing strategy.

There is no doubt that a great deal of work remains to be done before ASCo is fully operational and returning profits to the seafood industry and shareholders. An important use of the initial seed funds, therefore, will be to employ a business management consultant to facilitate formation of the company's structure and its partnerships with Sieber and Australian fertiliser companies. I am only acting as caretaker director of ASCo until a board of directors is established from the initial shareholders.

Ecologically sustainable disposal of fish wastes is one of the major issues facing Australia's seafood industry at the present time. I believe that ASCo's broad, cooperative approach to waste utilisation across all sectors of the seafood industry is one of the only ways that we will overcome these issues to the benefits of all involved. As a major Australian seafood company, I hope you can see the benefits of this cooperative approach to waste utilisation and are willing to become a shareholder of ASCo.

You may already have heard about the establishment of ASCo through MFMA or the NSW Catch Magazine, but if you have any questions about ASCo or would like further background information, please do not hesitate to contact me.

Yours sincerely

Ian Knuckey
Fishwell Consulting Pty Ltd

Address list of industry members sent the above letter

Company	Address1	City	State	Postcode
Racovolis Amalgamated Fish Agents Pty Ltd	Stalls 1-7 Melbourne Wholesale Fishmarket 440- 468 Footscray Rd	West Melbourne	VIC	3003
Raptis and Sons	PO Box 182	Hindmarsh	SA	5007
Department of State and Regional Development	GPO Box 4509RR	Melbourne	VIC	3001
FRDC	PO Box 222	Deakin West	ACT	2600
Master Fish Merchants Association	Locked Bag 247	Pyrmont	NSW	2009
MAFRI	PO Box 114	Queenscliff	VIC	3225
Seafood Services Australia	39 Upper Lancaster Rd	Ascot	QLD	4007
Mace and Company Ltd	P O Box 180	Nelson	New Zealand	
R.F. McLoughlin & Consolidated Fishermen	Stalls: 8-11, 14 Melbourne Wholesale Fishmarket	West Melbourne	VIC	3003
Jack Miriklis Pty Ltd	Stalls 12-13 Melbourne Wholesale Fishmarket 440- 468 Footscray Rd	West Melbourne	VIC	3003
Melbourne Fish Market	PO Box 12415	Melbourne	VIC	8006
South East Trawl Fishing Industry Association	PO Box 64	Beachport	SA	5280
Sydney Fish Market	Locked Bag 247	Pyrmont	NSW	2009
Better Choice Fisheries	79 Montague St	Fairy Meadow	NSW	2519
Victorian Trout Association	PO Box 258	Alexandra	VIC	3714
Poulos Bros	Locked Bag 247	Pyrmont	NSW	2009
Clarence River Fish Co-Op	51-55 River Street	Maclean	NSW	2463
Kallis Bros	Suite 1, 124-126 Church St	Brighton	VIC	3186
Musumeci Seafoods	Locked Bag 247	Pyrmont	NSW	2009
DeCosti Seafoods	Locked Bag 247	Pyrmont	NSW	2009
Claudio's Seafood	Locked Bag 247	Pyrmont	NSW	2009
Christies Seafood	Locked Bag 247	Pyrmont	NSW	2009
Peters Fish Market	Locked Bag 247	Pyrmont	NSW	2009
Nicholas Seafood	Locked Bag 247	Pyrmont	NSW	2009
Steve Costi Seafoods	Locked Bag 247	Pyrmont	NSW	2009
George Marnettas Seafoods	PO Box 820	Pyrmont	NSW	2009
Peter Michaels Seafood	47 Kingsway	Neutral bay	NSW	2089
Chipples Seafood	2 Lillian Fowler Pl	Cronulla	NSW	2230
Fairfield Fish Market	41 Smart St	Marrickville	NSW	2207
Doyles Seafood	11 Marine Parade	Fairfield	NSW	2165
Nichson Seafoods	Locked Bag 247	Watson Bay	NSW	2030
Yugo Seafoods	12 Belmore Rd	Pyrmont	NSW	2009
Peninsula Seafoods	3 Redgum Dve	Punchbowl	NSW	2196
Alifresh Seafood	47 McMeekin	Dandenong	VIC	3175
Austrimi Seafoods	62-66 Cowie Rd	Warmanbool	VIC	3280
Mantzaris Fisheries	44-54 Corio Quay Rd	Geelong North	VIC	3215
NSW Fishermans Cooperative Ltd	1 Wharf St	Geelong North	VIC	3215
Racovolis Fish Agents	9 Tahara Rd	Tuncurry	NSW	2428
Seafood Council (SA)	Level 1 16 Unley Road	Toorak	VIC	3142
Racovolis Fish Agents	9 Tahara Rd	Unley	SA	5061
		Toorak	VIC	3142

APPENDIX 4 LIST OF ASCO MEETINGS

Date	Meeting	Attendees	Description
03/05/02	Meeting of companies interested in ASCo	Grahame Turk, Terry Moran, Jim Mace, John Roach Michael Kitchener Julian Baldey, Malcolm McLaughlin, Ian Knuckey, Ted Loveday	Initial meeting to discuss the possible formation of ASCo and what it might achieve.
11/09/02	ASCo shareholders meeting	Grahame Turk, Terry Moran, Jim Mace, John Roach Michael Kitchener Gerry Hawkes, Julian Baldey, Malcolm McLaughlin, Ian Knuckey Richard Laney Wayne Street	Meeting to discuss broader shareholder base, Fish-P trials, funding opportunities and decide on company to undertake business plan.
12-13/12/02	George Town Seafoods	Ian Knuckey, George Domouras, Craig Doumouras and Rob McRoberts	View processing sites and discuss installation of a fish processing plant at George Town. Presentation of proposal to obtain funding from TAS industry development to install plant
24/01/03	George Town Seafoods	Ian Knuckey, Rob McRoberts	View processing site at Hobart and discuss progress with ASCo.
24/02/03	ASCo	Ian Knuckey, Grahame Turk, Malcolm McLaughlin, Craig Doumouras, John Roach, Michael Kitchener, John Wilson	Shareholders meeting for ASCO. Reviewed the shareholders agreement and finalised shareholders for the company.
9/04/03	ASCo	Steve Buckless, Julian Baldey, Kevin, Craig, David Doyle, Michael Kelly, Ian Knuckey, Malcolm McLaughlin, Barry McRoberts, Chris Papageorge, John Roach, Kerry Strangas, Grahame Turk, John Wilson, Wayne Street, Gordon Pender and Ron Watts	Australian Seafood Co-products Shareholders meeting
1/05/03	Street Ryan Consultants	Ian Knuckey, Wayne Street, Graham	Meeting to discuss consultancy for developing Business Plan for ASCo and to progress development of a proposal for Food Chains Project.
12/06/03	ASCo	Ian Knuckey, Roy Palmer, John Garven, John Roach, John Susman, Crispian Ashby, David Gregory, Wayne Street, Aravind Surapaneni	Meeting of the steering committee of the SEF Industry Development Subprogram
13/06/03	ASCo / Sieber / IQR	Ian Knuckey John Roach, Grahame Turk, Clive Sinclair, Jim Mace, Steve Buckless Crispian Ashby, Wayne Street, Gordon Pender, Mike McKosker, Brett Warren, Hans-Peter Weiderman	ASCo Director's meeting to finalise agreements with Sieber and discuss potential collaboration with IQR.
7/08/03	Street Ryan	Ian Knuckey, Wayne Street, Joan Gleeson	Meeting with Street Ryan to discuss Business network plan
03/09/03	ASCo	Ian Knuckey John Roach, Grahame Turk, Malcolm McLaughlin, Clive Sinclair, Bill	ASCo Directors meeting discuss Business Plan and decide on options

		Sinclair, Jim Mace and Wayne Street.	for progressing the business plan. Finalisation of IP agreement with Sieber and ASCo Fertilisers shareholders agreement.
03/09/03	ASCo Christmas Is phosphate	ASCo directors, Sieber, Wayne Street and Chris De Guigand	Chris DeGuigand attended the meeting to discuss possible collaboration of ASCoF and Christmas Is Phosphate Co.
03/09/03	ASCo / Incitec Pivot	Ian Knuckey, Clive Sinclair, Bill Sinclair, Jim Mace and Nigel Bodinnar	ASCo and Sieber directors met with Nigel Bodinnar, Technical Services Manager of Incitec Pivot to discuss the potential for Fish-P to be included as part of the Incitec / Pivot range of products
04/09/03	George Town Seafoods	Clive Sinclair, Bill Sinclair, George Doumouras and Craig Doumouras.	Sieber met with George Town Seafoods to discuss practicalities of installation of nutrient plant at the George Town site.
21/11/03	Incitec Pivot	Wayne Street, Charlie Walker, Product Development Manager, Incitec Pivot, Clive Sinclair, MD, Sieber Australia Pty Ltd	Discussed progress of development of Fish-P as a product to be marketed by Incitec Pivot. Developed an MOU between ASCo and Incitec Pivot.
22/11/03	Impact Fertilisers / George Town Seafoods	Wayne Street, Clive Sinclair, George Doumouras	Progressed discussion on the installation of a trial plant at George Town. Discussed potential partnership with Impact Fertilisers.