

A Village Fish Processing Plant: Yes or No?



A Planning Handbook

Prepared by
Institute of Social and Economic Research
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A VILLAGE FISH PROCESSING PLANT: YES OR NO? SUMMARY



This handbook gives advice about planning a fish processing plant in an Alaska village. It discusses things you should think about and questions you should ask. It focuses on small locally-owned fish processing operations in western Alaska, but much of the handbook is relevant to any fish processing operation, regardless of its location or size.

Starting and operating a village fish processing plant is not easy. It's a lot of work, and a lot of things can go wrong. Fish processing is a difficult business anywhere, but it's particularly challenging for small plants in remote villages. Small village fish processors face competition from larger fish processors elsewhere with lower costs of processing and transportation. Many fish processing plants end up losing money and shutting down. If that happens to your plant, you can lose a lot of money, time, and effort. So it's important to plan carefully and think realistically about whether you can succeed. Here are some of the most important things to think about:

Will there be enough fish? The run failures in western Alaska in recent years are a reminder of one of the biggest risks in the fish business—not enough fish. Think carefully about whether your fish plant will be able to process and sell enough fish to cover your costs. In a low-run year, when you don't sell many fish, you still have to pay overhead costs such as your manager's salary and plant maintenance. If your overhead costs aren't spread out over enough fish, your costs per pound of fish can be very high.

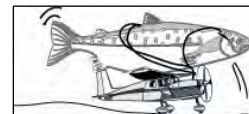


Will fishermen sell you the fish? Having a fish processing plant doesn't guarantee that fishermen—even the fishermen from your village—will sell you fish. Other buyers may compete with you for fish. You need to think about whether you will be able to compete with other buyers who may pay fishermen higher prices than you can pay. Even if there isn't any competition at the moment, there might be in the future—particularly when prices are high or when runs are low.



Can you produce consistent good quality? To get a good price that can make up for higher costs, good quality is absolutely essential for small village processing plants. You need to make sure that people pay strict attention to quality at every stage—from requiring that fishermen bleed and ice their fish to making sure that your fish are kept chilled while being transported to market.

Can you get reliable transportation at a price you can afford? Your fish plant can't succeed unless you have a reliable way to get the fish to your customers at a reasonable cost. If you're selling fresh fish that need to be shipped by air, your transportation costs and reliability will depend mostly on what length runway your village has, what kind of planes can land on it,



how often they can't fly because of bad weather, and how far they have to fly to get to a larger airport with jet service.

Can you find markets? You need to be as good at marketing fish as you are at processing them. You need to know how to find customers and understand and meet their needs. You have to produce products your customers want and deliver them reliably when they need them—at a quality as good as your competitors.

Can you get a good plant manager? Without a good manager, it will be hard for your plant to succeed. It's a tough job that requires a lot of skills. Managers need to be good at hiring people who can do the work, teaching them how to do it, and getting them to do the work well. Managers need to know how to maintain equipment and fix it when it breaks—or how to find someone who can. Managers need to be good at keeping track of how much money is being spent and how much money is coming in—and finding ways of not spending too much. They have to know what supplies are needed and to order them in time.



Can you get workers? Fish plant workers have to be there whenever fish are delivered, ready to work until all the fish are processed. Fish processing needs to be done carefully so your products are good quality and can sell for a good price. Workers need training—which costs time and money—so you need workers who will stay all season and come back in other years. It may be difficult to find local residents who want to work in your plant. If so, you'll need to hire people from outside the village—and feed and house them.



How much money will you earn or lose? Think carefully about what your sales revenues and costs are likely to be. Take the time and do the research to make realistic estimates of what prices you're likely to get for your products, what your processing yield is likely to be, and what your costs will be—particularly your costs for fish, workers, utilities and transportation. Remember to allow for unexpected costs when things go wrong—something always does. Remember that how much volume you process and your processing yield can make a big difference in how much money you earn or lose.

How much cash will you need to operate—and where will you get it? In the fish processing business you have to spend a lot of money before and during the season before you get paid for a single fish. Even if your total sales are more than your total costs, you won't be able to stay in business if you don't have enough cash when you need to pay your bills. Finding operating cash to get through the season is always a big challenge in fish processing, but particularly for new fish plants.

Think carefully about your financial objectives. Even if your goals are to provide a market for fishermen or create jobs, you still have to think about how much money you might earn or lose, and whether you will be able to afford to operate your plant.



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CHAPTER 1. INTRODUCTION

The purpose of this handbook is to help people interested in starting a fish processing plant in an Alaska village.

This handbook focuses on *small locally owned fish processing operations in western Alaska*. However, much of the handbook is relevant to any fish processing operation, regardless of its location or size.

This handbook suggests questions you should ask yourself as you plan a village fish processing plant. You will need to answer these questions to prepare a business plan and to apply for grants or loans.

The handbook explains why the questions are important and suggests how you can start to find answers. But only you can provide the answers that fit your goals, your fishery resources and your village.

A successful fish processing plant can earn money for the people or organization which operates it. It can provide jobs and income for village residents. It can provide a market for local fishermen. It can provide opportunities to process other food resources, such as reindeer or subsistence foods.

But starting and operating a fish processing plant is not easy. It is a lot of work to plan the operation, get the funding, build the facility, buy and install the equipment, get the required permits, and hire the workers. And once you are ready to start processing fish, a lot of things can go wrong. Sometimes the fish don't show up. Sometimes critical equipment breaks. Sometimes people don't do the work they are supposed to. Sometimes transportation and marketing arrangements don't work out the way you expected.

For these and many other reasons, many fish processing plants end up losing money and shutting down. An unsuccessful fish processing plant can cost you a lot of money, time and effort. And other people can get hurt too, if you can't pay them money you owe them.



We've had 31 competitors come and go since we started. —A long-time Western Alaska fish processor

This handbook can help you think about both the benefits of starting a fish plant and the things that can go wrong. The more carefully you think and plan, the more likely you are to be successful.

Steps in Planning a Village Fish Processing Plant

There are a lot of things to think about and questions to answer in planning a village fish processing plant. You can think about them in five broad steps. First you need to define your goals: why you want to start a fish plant and how much money you need to make.

Then you should do a reality check about whether you understand the challenges you will face; whether you have a strategy to overcome them; and whether you have the essential requirements for a fish plant—such as enough fish and adequate transportation.



Five Steps in Planning a Fish Plant

1. Define your goals.

Goals. Why do you want to start a fish plant?

Financial objective. How much money do you need to make?

2. Do a reality check.

Challenges. Do you understand the challenges you will face?

Strategy. Do you have a strategy to overcome these challenges?

3. Research things you can't control.

Markets. What products do markets want? What prices will they pay?

Fish resources. What species in what volumes are caught in your area?

Competition. Who is your competition in buying fish?

Transportation. What transportation is available for shipping fish?

Land. What locations are available for a plant?

Utilities. What utilities are available?

4. Plan things you can control.

Fish. How much fish will you buy?

Products. What kind of products will you produce?

Buildings. What kind of buildings will you use?

Equipment. What kind of equipment will you use?

Manager. Who will manage the operation?

Workers. Where will you find workers?

Season. How long a season will you operate?

5. Analyze if your plan works financially.

Capital. Who will put up how much money to start the plant?

Grants. What grants can you get?

Loans. How much money will you borrow and need to pay back?

Costs. How much money will you spend?

Revenues. How much money will you earn from sales?

Profit or Loss. How much money will you make or lose?

Cash flow. Will you have money when you need it?

Then you should research things you can't control that determine the opportunities for and limits to what kind of fish plant you could have—such as markets, fish resources, and transportation.

Then you're ready to plan the things you can control, such as how much fish you'll buy, what products you'll make, and what kind of building and equipment you'll use.

Finally, you need to analyze if your plan works financially: whether you can make as much money as you need to make, and whether you'll have cash on hand when you need it.

You will need to go through all of these steps again and again—not necessarily in this order. As you do more research and planning you will get a better understanding of what your costs and revenues might be, and how well your plan works financially. As you understand the finances better, you will probably make changes to improve your plan, until you have figured out what kinds of products and what kind of fish plant can work best for you—or if it can work at all.

If you decide to go ahead and build a fish processing plant, you will eventually need to develop a written business plan that will address all these questions. You will need a business plan to apply for a grant or a loan.

Planning a fish plant is a lot of work—but building, equipping, and operating a fish plant is much more work. Careful planning at the beginning can help you decide whether you can make enough money for the plant to operate successfully—and to make all that work worthwhile.

Symbols Used in this Handbook

The handbook uses these symbols to indicate different kinds of questions and information:



Reality check questions. These are the most important questions you need to ask yourself, to think about whether your project has a realistic chance of succeeding.



Planning questions. These are questions you will need to answer to plan for your fish plant—and to apply for a grant or a loan.



Alaska examples. These are examples or information based on experiences of fish processing plants in Alaska and data about Alaska fish processing plants.



Quotations. These are from interviews with people who have many years of experience working for or doing business with village processing plants.

Who Prepared this Handbook?

This handbook was written by Gunnar Knapp, an economics professor at the University of Alaska Anchorage's Institute of Social and Economic Research, and Terry Reeve, a professor with the University of Alaska Fairbanks' Alaska Sea Grant Marine Advisory Program based in Bethel. Gunnar Knapp has spent many years researching the economics of the Alaska fishing industry. Before joining the Marine Advisory Program, Terry Reeve worked for many years in western Alaska buying fish and developing fish processing operations. As a Marine Advisory Program agent for the AYK Region, he continues to work with village fish processing operations.

In preparing the original version of this handbook and the revised version, we talked to many different people who shared a lot of insight, experience and advice. We couldn't have prepared this handbook without their help. However, the handbook doesn't necessarily reflect their opinions. We are responsible for all of the information and advice in this handbook, as well as any errors.

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CHAPTER 2. DEFINING YOUR GOALS

The starting point in planning for a fish plant is *defining your goals*.

People have many different reasons for starting village fish plants. Some of these may include:

- **Making money.** Earning money for the people or organization operating the plant—such as a private entrepreneur, a Native corporation, a village council, or a CDQ group.
- **A market for fish.** Providing a market for fishermen in an area where there aren't any processors or where processors operate only some of the time.
- **Better prices for fish.** Paying fishermen better prices than existing processors do.
- **Jobs and income.** Creating job opportunities for local residents.
- **Other processing.** Providing a facility for processing other products besides fish, such as berries, reindeer, and subsistence foods.

Sometimes different goals for a fish plant may conflict with each other. For example, the more you pay fishermen, the less money you will have to pay plant workers or keep as profits. So having your own fish plant doesn't necessarily mean that you will be able to pay fishermen a higher price *and* pay workers a high wage *and* earn profits. So if you have multiple goals, you need to think about which goals are most important to you.

As a first "planning step," you should write down your own goals for starting a fish processing plant in your village. Try to be as specific as possible. This can help you think about whether your goals are realistic. If you apply for a grant or a loan, the organization you apply to will also want to know about your goals.



Do you have a clear understanding of your goals and why you want to start a fish plant?



Providing jobs is a goal for many village fish processing plants.

Emmonak residents filleting thawed chum salmon.



Loading wetlock boxes of fresh H&G salmon a flatbed truck at the Quinhagak plant to take them to airport



Financial Objective

Part of defining your goals is defining your financial objective, or how much money you want or need to make. Even if “making money” isn’t your goal, you still need to think about your financial objective. No one can afford to think that because they’re not trying to make money, they don’t have to think about money in planning a fish plant.

Probably your financial objective is one of the following:

- **Make a profit.** Making a profit means doing better than breaking even. It means having money left over after you’ve paid your bills and your loan payments. Most privately-owned fish processing plants—those owned by individuals, families, partnerships or corporations—want to earn a profit on the money they have invested.
- **Break even.** This means earning enough money to cover your costs: to pay your bills and make your loan payments. Most fish plants need to at least “break even” most years in order to stay in business, although they may be able to afford to lose money some years if they earn enough in other years. Organizations with non-financial objectives, such as providing markets and creating local jobs and incomes, may be satisfied with breaking even.
- **Don’t lose too much.** If a “parent” company or organization, such as a CDQ group, is willing to cover your losses, your fish plant may not necessarily need to break even. But you still need to think about how much money you can afford to lose. There will be some limit to what they will be willing to pay to keep your fish plant going.

? *What is your financial objective?*

How much money do you want to make? Do you want to earn a profit on your investment? Would you be satisfied with breaking even? Would you be satisfied with losing money, if you can achieve other objectives?

How much money do you have to make? Do your fish sales have to cover all your costs? Or is there some other source of funding, such as a CDQ group, which could help cover the plant’s cost? How much funding would be available?

How soon do you need to make money? If you think the plant may lose money at first but will become profitable after one or more seasons, how long can you afford to lose money? If fish runs or markets are poorer than expected, how long can you afford to lose money?

How much financial risk are you able and willing to take? How much money are you willing to risk losing if things don’t work out the way you expect?



Marshall Fish Plant Goals. Here's how the feasibility study for a fish plant in Marshall described the benefits the plant would provide to the community:

Increased employment: the addition to the local economy of one full-time position and 32 season positions, which will generate approximately \$80,000 in personal income annually.

Increased income for fishermen: the fishermen will be able to harvest more of their resource, as they will not be restricted by harvest quotas previously applied by processors.

Increased capital: the profits can be used as investment capital to finance other ventures or to expand the fish processing endeavor.



Unalakleet Fish Plant Goals. Here's how a 1996 proposal described the goals for a fish plant in Unalakleet:

The ability to produce market ready products within our region moves us closer to our goal of regional empowerment and enables us to create marketing related businesses which otherwise would be sacrificed to other communities outside the Norton Sound region At present, the resource is totally in the control of a commodities-type market whose prices are set by outsiders.

Increasing the value of the fishing industry through higher prices will undoubtedly increase the value of the Limited Entry Permits, and in turn will hinder the current practice of fishermen selling their Limited Entry Permits instead of using them for fishing operations themselves. . . . Eliminating this anti-economic practice will contribute directly to greater regional fishermen employment while creating fish processing jobs.

The plant will retain 270 employees and create another 163 positions in all areas of the economy, which benefits from this proposed plant and the industry it will produce.

Due to climatic conditions and control of processing activities by outside interests, certain fisheries have not had buyers. The winter crab fishery is a good example. When the new plant is in place, we anticipate that 100,000 pounds of crab can be harvested commercially by and for the benefit of local fishermen.

CHAPTER 3. A REALITY CHECK



Before you spend a lot of effort and money in planning a village fish processing plant, you should do a reality check about whether there is a reasonable chance that it might succeed—or whether there are fundamental obstacles that make it unlikely that it could succeed. If you can't answer “yes” to the reality check questions in the chapter, it would probably be difficult for your plant to succeed.

It's Hard for a Small Village Processing Plant to Succeed

It's hard for small fish processing plants in small western Alaska villages to succeed. Only a few plants have operated successfully over a long period of time. Here are some of the reasons why:

Fish processing is a difficult business. All fish processors face the challenges of varying and uncertain fish supply and working with a highly perishable product.

Fish processing is a highly competitive business. Village fish processors face competition from larger Alaska processors supplying markets with similar products in much larger volumes. These processors in turn face competition from both wild and farmed seafood producers from around the world. Margins are usually small in the fish processing business. Even the most efficient processors usually earn only a small profit per pound of fish sold.

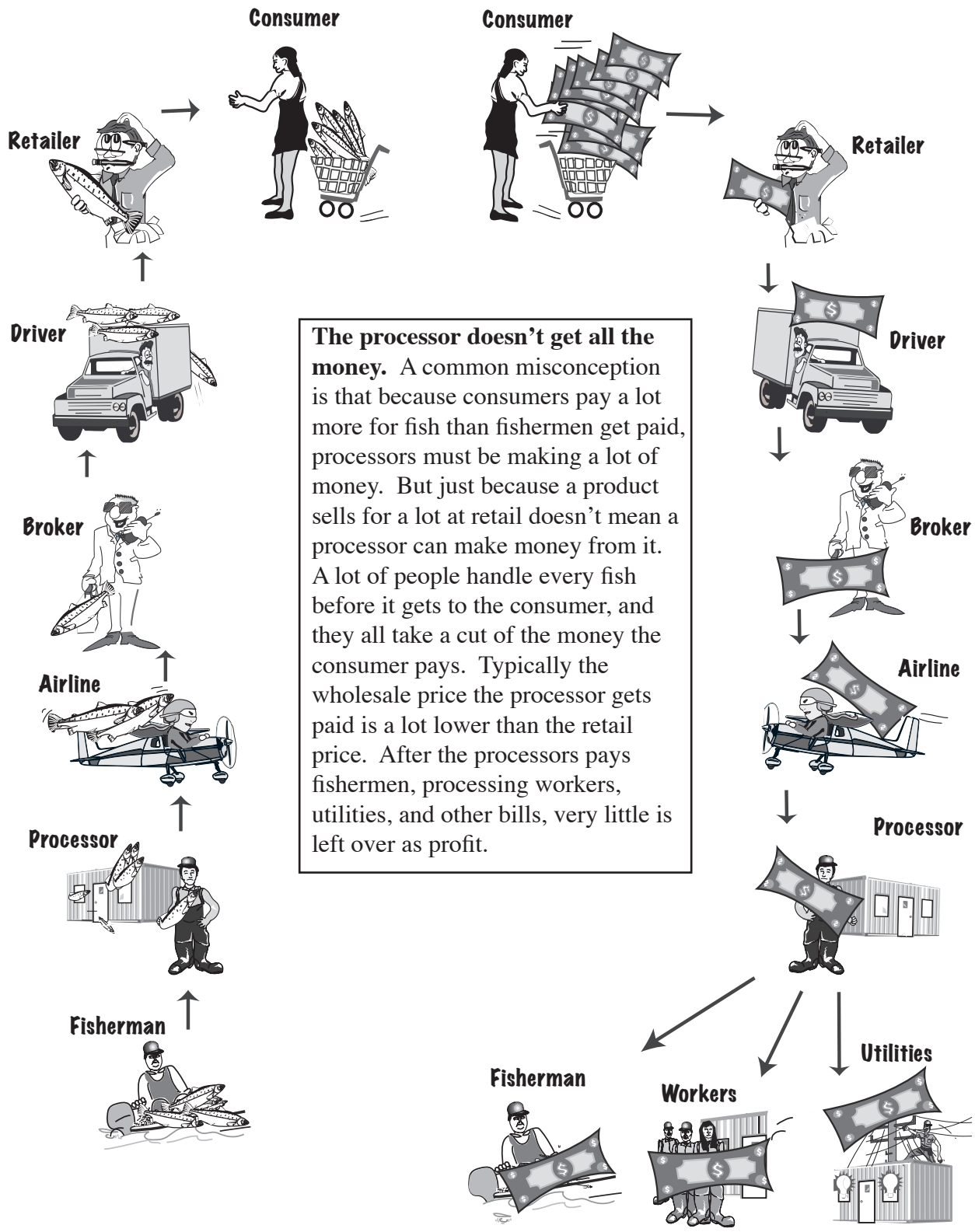
Small processing plants face higher costs. Small processing plants can't get deals as good as their larger competitors do by buying in bulk, on everything from boxes to insurance.

Costs are higher in villages. Everything from labor to utilities costs more in small villages than it does for processors located in larger communities with road access or jet service.

Costs of transportation are typically much higher for small villages. Not only is it more expensive to ship fish out, but it's more expensive to ship supplies in.

Transporting fish to market from villages takes longer and transportation is less regular and reliable. Time and reliability are critical in transporting fresh fish to market.





The processor doesn't get all the money. A common misconception is that because consumers pay a lot more for fish than fishermen get paid, processors must be making a lot of money. But just because a product sells for a lot at retail doesn't mean a processor can make money from it. A lot of people handle every fish before it gets to the consumer, and they all take a cut of the money the consumer pays. Typically the wholesale price the processor gets paid is a lot lower than the retail price. After the processors pays fishermen, processing workers, utilities, and other bills, very little is left over as profit.

People with experience in operating village processing plants and doing business with them consistently point out that it's not an easy business to be in. It's worth listening to their advice:



It's a very convoluted business and I don't think anyone ought to enter it without a very detailed business plan up backed up with an incredible amount of research.—A long-time Alaska fish processor

I have found from experience that there's a tremendous amount of expense in getting the product to market. If this was easy money, you'd have thousands of people doing it. It's not.—A long-time Alaska fish processor.

It's a big undertaking. It's one of those things where you have to be careful what you ask for. If you just went on good common sense it probably doesn't make sense to start a lot of these projects. If you look at all the facts, it's just a tough road. Really knowing what you're getting into is important.—An experienced western Alaska fish processor and buyer

There's an expectation that somebody's making a lot of money and if you just did the same thing you'd make a lot of money. There's not a lot of money in building and running a processing plant and marketing. It is a small percentage.—An experienced Alaska fish processor

Our purpose in pointing out the challenges village fish processing plants face is *not* to say that your fish processing plant can't succeed or that you shouldn't try. Village fish processing plants *can* succeed and bring real benefits. But you are more likely to succeed if you start with a realistic understanding of the challenges you will face and what you need to think about and plan for.



*Sure, there's a lot of problems, and you shouldn't underestimate them, but it can also be exciting and personally rewarding.
—An experienced western Alaska fish processor.*



Do you understand the challenges small village fish processing plants face?

Do you understand that it's not easy to operate a village fish processing plant successfully?

Having a Strategy for Success

Village processing plants can succeed in the highly competitive fish processing business despite the challenges of higher costs and more difficult logistics. But in order to succeed, you need a strategy to make up for these challenges.

You're not likely to succeed if you try to sell the same products at the same prices as competitors with significantly lower costs. You will need to sell different products, or get better prices, or find a way to lower your costs. For example, your strategy might be to get better prices by producing particularly high-quality products or by having an effective marketing story about special characteristics of your fish, your region, or your operation.

You will need to think carefully about what strategy can succeed for you, and you will need to focus on your strategy as you plan, build and operate your plant.



The bad news is you're not going to be all that competitive. The good news is that doesn't mean there isn't a way to build a successful small business. You succeed by some strategy whereby you do it different. You figure out some niche or some strategy that gives you some advantage to compensate for this overall disadvantage. —A long-time Alaska fish processor

If you just go in with a commodity, you're not going to have much of a chance. One thing we appreciate about small village settings is that you can usually instill the importance of bleeding and icing and quality control. That's something that we can take to market.—An experienced western Alaska fish processor and buyer

Can you operate more cheaply or sell for more money than the big processors? Those are the only opportunities to make money.— An experienced Alaska fish processor



Do you have a strategy to offset the cost and logistical challenges faced by village fish processing plants?

Community Support Matters

For your plant to succeed it's important to have the support of the community. People need to understand what you are doing and feel that the community will benefit from it. Otherwise fishermen may not sell you fish, or the community may object to disruptions caused by your plant, such as bringing in non-local people to work in the plant.



Will people in your community support your plant?

Consider Starting Small

A good way to learn whether your plant can be successful is to start small. For example, before you build your own plant, you may wish to have some local fish custom processed and sell them. From this you can learn something about what processing costs, how potential buyers respond to fish from your area, and how good you are at marketing fish.

If things go well, you can get more custom processed the next year, or you can start your own processing operation. If things don't go well, you haven't lost a lot of money learning an expensive lesson.



The main thing is trying to figure out a plan that looks into the future so that you don't have to do it all in one year. It's hard to be successful in this business. You have to find a way to find little bits of success all along the way.

If you have fish from the previous season, or fresh, even a small amount, go through the steps of custom processing. Have somebody do a small batch. By just doing a few thousand pounds of fresh out of a certain area, even though your costs might be up, you'd have some real numbers to look at.

I've found that sometimes just doing a very small amount of something can give you enough information so that you can say "well, if we did a hundred times more it would have been profitable" or "gosh, we're just barking up the wrong tree, we're never going to make this thing work, I'm glad we just did it with a few hundred pounds."—An experienced western Alaska fish processor and buyer

If you're a fisherman, another way you can "start small" and gain experience in quality control, fish distribution and marketing is to become a "catcher-seller." Under state regulations, a "catcher-seller" is allowed to bleed and gut fish and market them within Alaska. Catcher-sellers are not allowed to buy fish from other fishermen or do any processing beyond bleeding and gutting. Applying for a catcher-seller permit is easy. The application is issued annually, is free and takes just minutes to fill out. More information about the catcher-seller program, as well as catcher-seller application forms, can be found on the Alaska Department of Fish and Game website at www.cf.adfg.state.ak.us/geninfo/permits/forms_cs.php.

If you're a fisherman and you want to take the next step and process fish, have fish custom-processed for you, or ship unprocessed fish outside Alaska, you can obtain a Direct Marketing Fisheries Business License from the Alaska Department of Revenue. The Direct Marketing Fisheries Business License does not allow you to buy fish from other fishermen for processing. More information about how to apply for a Fisheries Business License can be found on the Alaska Department of Revenue's Tax Division website at <http://www.tax.alaska.gov/programs/forms.aspx>.

CHAPTER 4. FISH PROCESSING FINANCIAL BASICS

Analyzing your finances is a critical part of planning a fish processing business: Two kinds of financial analysis are most important:

- **Profit and loss analysis.** This is thinking about your revenues and your costs, which determine how much money your plant is likely to make or lose.
- **Cash flow analysis.** This is thinking about *when* you'll be earning and spending money, and whether you'll have enough cash on hand when you need it.

This chapter describes the basics of these two kinds of financial analysis. In all the other planning you do for your fish plant—from how you will buy fish to how you will process, transport and sell it—you need to think about how each step will affect your costs, revenues, and cash flow.

In analyzing your finances, you'll need to use your best judgment. Until you actually build your plant, you won't know for sure what your facilities and equipment will cost. Until you actually operate your plant, you won't find out how many fish you can buy, or what you have to pay fishermen to be competitive, or what prices you can sell your products for.

As you begin planning your fish plant, it's OK to start simple, with ballpark estimates of your costs, revenues and cash flow. A simple analysis may be enough to tell you whether you have a reasonable chance of achieving your financial objective. As you continue planning, you'll need to do a progressively more detailed analysis, with more careful estimates of your costs, revenues and cash flow. You'll need this to write a business plan and to apply for a grant or a loan.



“You need to think about the finances before you even get to the fun stuff, which is laying out your plant and buying all the shiny equipment.”—An experienced Alaska fish processor.

Profit and Loss Analysis

Profit and loss analysis is thinking systematically about your revenues and your costs, which determine how much money your plant is likely to make or lose. The table below shows a simple example of a profit and loss statement (also called a P&L or a “pro-forma” statement) for a hypothetical fish processing plant.

Financial accounting terminology can be confusing. Not everyone uses the same terms. The table shows terms commonly used in the fish processing business, as well as corresponding standard accounting terms.

The plant in this example buys 1 million pounds of fish each year. The processing yield is 60%, so the total product weight is 600,000 pounds. The plant’s products sell for \$3.00/lb, so the total sales are \$3.00/lb x 600,000 lbs = \$1,800,000 (Row 1).

**Summary of a Profit and Loss Statement for a Hypothetical Fish Processing Plant
Processing 1,000,000 Pounds with a 60% Yield**

Row	Terms			Sales, costs and profit		
	Common term used in fish business	Standard accounting term	What the component includes	Total	Per round pound	Per processed pound*
1	Sales	Revenues	Sales value of finished products	\$1,800,000	\$1.80	\$3.00
2	Fish cost	Cost of raw material	The total cost of the fish you buy, including payments to fishermen, the cost of services for fishermen (such as ice), tendering, and taxes	\$700,000	\$0.70	\$1.17
3	Processing cost	Production cost	Direct costs of processing your fish, such as processing worker wages, packaging, utilities, storage and freight.	\$1,000,000	\$1.00	\$1.67
4	Gross profit	Gross profit	Sales - fish cost - processing cost	\$100,000	\$0.10	\$0.17
5	Overhead	Operating expenses	Costs not directly related to processing fish, such as management, insurance, professional services, office supplies, repairs, replacement and maintenance.	\$250,000	\$0.25	\$0.42
6	Net profit	Net profit	Gross profit minus overhead	-\$150,000	-\$0.15	-\$0.25

Note: The costs and prices used in this example are for illustration only. Actual costs and prices may vary widely.

How well is this plant doing financially? The table shows two measures:

Gross profit (line 4) shows the sales value of the fish minus the direct costs of buying and processing the fish. In this example, the plant is making a gross profit of \$100,000, or \$.10 per round pound. Unless you’re willing and able to lose a lot of money, it’s essential to have a positive gross profit (rather than a gross loss). Otherwise you’re losing money on every fish you buy.

Net profit (line 6) shows the sales value of the fish minus all the costs of operating the plant. These costs include overhead, or the costs not directly associated with processing

fish, such as management and insurance. In this example, the plant is losing \$150,000, or $-.15$ per round pound. It won't make money operating at this scale. But if it processed more fish, so that the overhead costs per pound were lower, it might be possible for the plant to make money.

As you begin planning your fish plant, you should do a profit and loss analysis like that shown in the example. At first you will have to base your analysis on rough estimates of your revenues and costs. As your planning becomes more detailed, your estimates should become more accurate, and you should get a better understanding of how much money your plant is likely to earn or lose.¹

Important Things to Remember in Thinking about Your Finances

As you think about your expected costs, revenues and profits, here are seven of the most important things to keep in mind.

1. Make sure you compare costs and revenues on the same weight basis.

In the example, the plant's total costs are $\$1.95$ per round pound ($\$.70$ /lb fish cost, $\$1.00$ /lb processing cost, and $\$.25$ /lb overhead cost).

The plant's products are selling for $\$3.00$ per processed pound. Since $\$3.00$ /lb is a lot more than $\$1.95$, it might sound like this plant is very profitable. But $\$3.00$ per processed pound works out to only $\$1.80$ per round pound—which is less than the total cost of $\$1.95$ per round pound. So the plant is actually losing money.

The plant's costs add up to $\$3.25$ per processed pound ($\$1.17$ /lb fish cost, $\$1.67$ /lb processing cost, and $\$.42$ /lb overhead cost)—which is more than the $\$3.00$ /lb that the product is selling for.

As you think about your plant's finances, you can measure costs and revenues either per round pound or per processed pound—but it's important to compare them using the same measure.

2. Processing yield matters!

Processing yields are very important for a fish plant. You don't sell the same weight of fish as you buy. As you remove fish heads, guts, bones and other parts, the weight of the final products you get from a fish is typically only about 50-70% of the "round weight" of the fish that you buy from fishermen—depending on the product.

Our fish plant is buying 1 million pounds of fish every year, and selling its product for $\$3$ per pound. Every 1% loss in yield is a 1% loss in revenue. If the yield goes down by 1% the plant's revenues go down by $\$30,000$.

¹ A useful reference for preparing a profit and loss analysis may be *Simple Financial Analysis for a Small Fish Processing Plant*, by Gunnar Knapp, available at www.iser.uaa.alaska.edu/iser/people/knapp.

If the plant was able to increase its yield from 60% to 70%, its total revenue would go up from \$1,800,000 to \$2,100,000—and it would go from losing \$150,000 to making a profit of \$150,000. So everything you can do to improve processing yield at your plant is important. Even a relatively small change in your revenues can make a big difference in your profit.

Effect of Processing Yield on Revenues and Profits for a Hypothetical Fish Processor

	Total		Per round pound	
	60% yield	70% yield	60% yield	70% yield
Total round pounds	1,000,000	1,000,000		
Total processed pounds	600,000	700,000		
Wholesale Price	\$3.00	\$3.00		
Revenue	\$1,800,000	\$2,100,000	\$1.80	\$2.10
Fish cost	\$700,000	\$700,000	\$0.70	\$0.70
Processing cost	\$1,000,000	\$1,000,000	\$1.00	\$1.00
Gross profit	\$100,000	\$400,000	\$0.10	\$0.40
Overhead	\$250,000	\$250,000	\$0.25	\$0.25
Net profit	-\$150,000	\$150,000	-\$0.15	\$0.15

3. Production volume matters!

Your fish plant’s direct costs—which include fish costs and processing costs—stay about the same per pound regardless of how much fish you process. The more fish you process, the more you have to pay fishermen and the more you have to pay for labor and boxes.

However, your fish plant’s *overhead* costs don’t go up as much when you process more fish. For example, you’ll have to pay your plant manager about the same regardless of how much fish you process. So if you process three times as much fish, the manager will cost you only one-third as much per pound.

If your plant processed and sold three times as much fish, and spent three times as much for fish cost and processing cost but held the overhead costs the same, it would go from losing \$150,000 to making \$50,000.

Effect of Volume on Revenues, Costs and Profits for a Hypothetical Fish Processor

	Total		Per round pound	
	Plant processes 1,000,000 round pounds	Plant processes 3,000,000 round pounds	Plant processes 1,000,000 round pounds	Plant processes 3,000,000 round pounds
Yield rate	60.0%	60.0%		
Total processed pounds	600,000	1,800,000		
Wholesale Price	\$3.00	\$3.00		
Revenue	\$1,800,000	\$5,400,000	\$1.80	\$1.80
Fish cost	\$700,000	\$2,100,000	\$0.70	\$0.70
Processing cost	\$1,000,000	\$3,000,000	\$1.00	\$1.00
Gross profit	\$100,000	\$300,000	\$0.10	\$0.10
Overhead	\$250,000	\$250,000	\$0.25	\$0.08
Net profit	-\$150,000	\$50,000	-\$0.15	\$0.02

The more fish you process, the more money you earn to help cover your overhead cost. This is one reason why it's difficult for small processing plants to compete with large plants that can spread overhead costs out over more fish.



The more business you do, the more absolute profit you make in a good year. It is heavily scale-dependent. People think, well I'm just going to do a small one. Well, they probably won't because of scaling issues. They probably won't make enough to satisfy themselves.
—An experienced Alaska fish processor

4. Product mix matters!

In thinking about the finances of a fish plant, people often forget that not every fish you sell is a #1 and not every fish gets a #1 price. Some fish are lower quality and can only be made into products which sell for lower prices. That cuts into your revenues and your profitability.

In our example we assumed that the plant's products all sold for \$3.00/lb so that it earned total revenues of \$1,800,000. But if 30% of production was #2 product which sold for a lower price of only \$2.00/lb, then the average sales price would only be \$2.70/lb.

Effect of Product Mix on Revenues of a Hypothetical Fish Processing Plant

	100% #1	70% #1 and 30% #2		
	Total	#1 product	#2 product	Total
Production volume	600,000	420,000	180,000	600,000
Sales price	\$3.00	\$3.00	\$2.00	
Sales revenue	\$1,800,000	\$1,260,000	\$360,000	\$1,620,000
Average sales price	\$3.00			\$2.70



Keep in mind that that the market doesn't want every fish that you can buy or catch. There's going to be fish that the market will not take. However, your costs of handling even those non-marketable fish is going to be close to the same. That is really going to cut into the bottom line.
—An experienced Alaska fish processor

5. If the price you can sell your products for goes up, the price you have to pay fishermen will probably go up too.

One of the challenges in the fish processing business is that when markets for your products are good, they're also good for your competitors. If you get a good price for your products, your competitors will too—if they're producing similar quality.

If prices go up and your competitors are making money, they will probably try to buy more fish—by raising the price they pay fishermen. You're probably going to have to match the prices your competitors pay. That's good for fishermen, but it makes it harder for fish processing plants to make a profit.

Remember to allow for this as you plan your finances. If you think the prices for your products are going to go up, that doesn't necessarily mean your plant will get more profitable—because if the price you pay fishermen is probably going to go up too.



“The reality is you’re going to have to pay the cash buyer price. And you’re probably going to have to pay the cash buyer price for most of the season. And that’s why you lose money. There’s no easy way to skin the cat.”—An experienced Alaska fish processor.

6. Plan for unexpected extra costs.

As you do your financial analysis, remember that not everything goes according to plan in the fish processing business. All kinds of problems can happen. Machines can break, so you may lose several days of production. Bad weather can keep planes from flying—so that you have to freeze your fish rather than selling them fresh. Customers may not pay their bills—leaving you with less money than you had been promised.

While you can't predict *what* will go wrong, you can be pretty sure that *something* will go wrong. As you do your financial planning, it's a good idea to build in contingency factors for unexpected costs and for bills that don't get paid. Even though these problems may not be your fault, they will still affect your costs and revenues and whether your plant can be profitable. So plan for them.

7. Focus on the big costs.

Some costs are much more important than others for your financial planning. In particular, costs of fish, labor, utilities and transportation will probably be the biggest costs for your plant. As you think about your finances, focus on the costs that are going to be most important. Every cost matters. But it's much more important to have an accurate estimate of what wages and transportation will cost you than it is to have an accurate estimate of what insurance or office supplies will cost you.



“To start thinking about the cost of your plant, look at the big costs that make up the top 80% or so. Wages and the cost of fish—those are the two biggies by far. And then utilities and shipping costs. If you looked at no others and just did those four, you would know pretty much whether your plant was going to be feasible.”--An experienced Alaska fish processor.

Cash Flow Analysis

As you plan your fish plant finances, it isn't enough to think about your total costs and revenues over the year. It's also very important to think about your cash flow—when you will need to spend money and when you will be earning money. If you don't have money when you need it, you won't be able to stay in business.



If the money comes in four months after you go broke, it doesn't help. More businesses have gone under because they couldn't get the cash when they needed it.—An experienced Alaska fish processor

Cash is king. It doesn't matter how much money you're going to make on paper. If you don't have it in your pocket when you need it, you're dead.—An experienced Alaska fish processor

*All you gotta do is be a couple weeks late paying your fishermen and you're not going to get any volume.
—An experienced Alaska fish processor*

A lot of people tend to manage by what's in their wallet. 'If I have money in my wallet, I must be doing fine.' Well, that is one level of cash flow management. But if you've got a big thumping bill coming up, and you haven't got enough to pay it, you're dependent on more money coming in the door between now and then. It's really common sense. But a lot of people don't do that step or they don't think about it seriously. They don't think about the risks associated with not getting the cash when you think you're going to get it.—An experienced Alaska fish processor

Cash flow is very important in the fish processing business because you need to spend a lot of money before you get paid for your fish. You have to spend money before the season to ship in supplies and fly in workers. Usually you need to pay the fishermen, plant workers and airlines who catch or handle your fish before you get paid by the customer who finally buys the fish.

To analyze your cash flow, think about each kind of cost your plant will face and when you'll be spending the money. You'll have to spend a lot of money gearing up before the season, buying and shipping in supplies such as packaging, and getting the plant ready to process. You'll spend a lot of money during the season buying fish and paying workers. Some of your costs will be spread over the entire year, such as the manager's salary.

Also think about when you'll have money coming in from fish sales. The money will probably come in from fish sales later than the money goes out to pay fishermen and processing workers.

The table shows an example of a cash flow analysis for a hypothetical fish plant. The plant has total costs of \$1,950,000 (like in our other examples) but \$2,000,000 in sales—so it has the potential to be a profitable plant.

The plant has to spend \$600,000 before the season to gear up. So if it starts the year with only \$500,000 in cash, by the end of May it won't have enough cash to pay its bills—and it will go out of business. Even if it starts the year with \$700,000 in cash, it will still run out of cash by the end of June, because not enough money will have come in from sales yet to pay fishermen for the fish they delivered in June and to pay processing workers for the work they did in June. The plant needs to start the year with \$800,000 in cash to get through June with \$75,000 in cash—which isn't very much of a reserve in case something goes wrong and the plant faces an unexpected major expense.

Cash Flow Analysis for a Hypothetical Fish Processing Plant

	Money going out				Money coming in from fish sales	Cash balance at the end of the month		
	Before the season to gear up	During the Season	Year round	Total		Starting cash balance of \$500,000	Starting cash balance of \$70,000	Starting cash balance of \$800,000
Fish cost		\$700,000		\$700,000				
Processing cost	\$500,000	\$500,000		\$1,000,000				
Overhead cost	\$100,000	\$100,000	\$50,000	\$250,000				
TOTAL	\$600,000	\$1,300,000	\$50,000	\$1,950,000	\$2,000,000			
January	\$0	\$0	\$4,167	\$4,167	\$0	\$495,833	\$695,833	\$795,833
February	\$0	\$0	\$4,167	\$4,167	\$0	\$491,667	\$691,667	\$791,667
March	\$0	\$0	\$4,167	\$4,167	\$0	\$487,500	\$687,500	\$787,500
April	\$300,000	\$0	\$4,167	\$304,167	\$0	\$183,333	\$383,333	\$483,333
May	\$300,000	\$0	\$4,167	\$304,167	\$0	-\$120,833	\$79,167	\$179,167
June	\$0	\$433,333	\$4,167	\$437,500	\$333,333	-\$225,000	-\$25,000	\$75,000
July	\$0	\$433,333	\$4,167	\$437,500	\$666,667	\$4,167	\$204,167	\$304,167
August	\$0	\$433,333	\$4,167	\$437,500	\$666,667	\$233,333	\$433,333	\$533,333
September	\$0	\$0	\$4,167	\$4,167	\$333,333	\$562,500	\$762,500	\$862,500
October	\$0	\$0	\$4,167	\$4,167	\$0	\$558,333	\$758,333	\$858,333
November	\$0	\$0	\$4,167	\$4,167	\$0	\$554,167	\$754,167	\$854,167
December	\$0	\$0	\$4,167	\$4,167	\$0	\$550,000	\$750,000	\$850,000

Getting enough operating capital—cash to get you through the season—can be a major hurdle for a new processing plant. An established plant with a track record of successfully processing fish can get a “pack loan” from a bank. But banks are much less likely to lend to a new business. So you will probably have to use your own money or that of other investors for operating capital to get your plant started. And it will be your own money that's at stake if your business isn't profitable.



What do you bring to the table? Do you bring empty pockets? There's no substitute for energy and creativity, but there's no substitute for hard cash. —An experienced Alaska fish processor

CHAPTER 5. PRODUCTS AND MARKETS

A critical part of planning a fish plant is planning what kinds of products you will produce, what kinds of customers you will sell them to, and what prices you are likely to receive.

Many Alaska seafood companies have invested time, money and effort to build processing plants that produced excellent products, only to go out of business when they could not sell their products for a high enough price to stay in business. Many of these companies failed because they didn't research and understand the markets for their products.

Here are some of the things you—or someone working with you—should do as part of your market research:

- Identify potential products your plant could produce.
- Identify potential customers for products your plant could produce.
- Talk to potential customers to learn about their needs and expectations.
- Determine whether you can produce products that meet the needs and expectations of potential customers.
- Estimate what potential customers would be willing to pay for these products and what kind of sales volume you could reasonably expect from them.
- Learn what similar products sell for in the markets you hope to sell to.
- Analyze your strengths and weaknesses compared with your competitors..
- Develop a marketing plan for selling your products.

Market research is absolutely essential for any business. Just making products and hoping that someone will buy them is the fastest way to business failure.

Researching markets is a lot of work and requires expertise about the seafood market. So as you plan for your plant, you may want to work with a consultant who can help you with your market research.



Are you willing to research your markets carefully before you make the decision to build a fish plant?

Learning About the Seafood Distribution System

If you're going to have a fish plant then you need to understand who the players are in the seafood distribution system—from fishermen to retailers—and what their needs are and how they operate. You need to think carefully about where you might fit into this system, and what kind of buyers you should be selling your products to.

Depending on the products you produce and the volumes you produce, it may make sense for you to sell your products to another processor, a trader or distributor, or directly to a retailer or food service operation. It may make sense for you to sell your products yourself or to have a broker sell your products for you for a commission.



You should know what the matrix of distribution is, and whether you want to go through a brokerage or go direct and what are the benefits of all those different things. It's kind of boring stuff if you just want to produce fish and get it out there, but somebody really needs to have that understanding.—An experienced western Alaska processor and buyer

Learning About Markets for Your Fish

You need to learn as much as you can about the markets for the kinds of products your going to be producing and selling. You need to learn about what can affect prices, and why prices you can get for your products vary from day to day, from month to month, and from year to year.

Market conditions for Alaska salmon are changing rapidly. One of the factors behind changing market conditions is farmed salmon, which made salmon much more widely available, introduced new product forms such as boneless, skinless fillets, and greatly increased quality standards. Even though many buyers prefer wild salmon, they still want convenient and attractive product forms—and they are becoming more and more rigorous in their demands for consistent good quality.



*There's some excellent product now. I wouldn't say that was the case back in the 80s, there was a lot of poor quality wild product. Most of those companies went by the wayside. They've been replaced by companies with close to impeccable quality for wild salmon.
—An experienced western Alaska fish processor*

We try to make the very best product that we can. We try not to sell anything that we wouldn't want to eat ourselves. Which seems like an obvious thing to say—but sometimes you taste stuff and you wonder 'why is this being sold?—An experienced western Alaska processor and buyer

Your fish plant will be competing with other Alaska salmon processors, many of whom have lower transportation costs and can get fresh salmon to market quicker. What kinds of products they produce and how much they produce will affect the prices you can get for your products. You may wish to produce different product forms, or process at different times of year, than competing processors in your area.

When you are in the business of processing and selling fish you will need to pay close attention to market conditions and how and why they are changing. You should talk to your potential customers about market conditions. You should subscribe to publications which report about market conditions. You can also find a lot of market information on the Internet. You need to learn to use this information so you can make reasonable forecasts about how the prices you get for your products are likely to change from year to year. Fish prices are difficult to predict, but one thing you can be sure of is that they won't stay the same.

Identifying Products Your Plant Could Produce

As you learn about markets for different products, you should also make a rough estimate of what it might cost to produce them, and which work for your plant. Remember that many things will matter to potential buyers of your product, including its quality, what volume you can supply, when you can supply it, how reliably you can supply it, and what you can do to help promote it.

Try to have more than one product and more than one market. Not every fish that you buy will be a #1 fish (although this should be your goal). You need a way to process and sell lower-quality fish without hurting the market for your higher quality fish. And it's better to have choices if a problem develops with one market.

What products are best for your plant?	
Less value added (<i>H&G</i>)	More value added (<i>fillets, smoked fillets, etc.</i>)
Higher production capacity Lower labor costs Less skilled labor needed Lower equipment costs Fewer things to go wrong Easier marketing	Higher prices More processing jobs Lower transportation cost
<i>But</i>	<i>But</i>
Lower sales prices Fewer processing jobs Higher transportation cost	Lower production capacity Higher labor costs More skilled labor needed Higher equipment costs More things to go wrong More difficult marketing



Value-adding isn't necessarily profit-adding.

Many people believe that they will make more profit by producing a “value-added” product such as smoked salmon or fillets. A long time fish processor near Circle, Bill Straub, said that he tried every kind of value-adding he could think of for the Yukon king salmon that he caught. In the end, he decided that every time he touched his fish it cost him money. His final operation consisted of heading, gutting and freezing his fish at his fishing site and trucking his season's catch in a freezer van to Fairbanks at the end of the season. His operation was successful because he and his wife worked long hours and kept their operation simple.

Talking to Potential Customers

As much as possible, you should talk to potential customers to learn what their needs are and learn how you can meet their needs. Different buyers will have different requirements and expectations for quality, packaging, volume, timing of purchases, prices, and other factors. Here is some of the information you should try to learn from potential buyers:

- The types of seafood products they buy.
- Their expectations about quality.
- How much of your product they might be interested in buying.
- What prices they have paid for these products in the past. They probably won't want to tell you what they might pay in the future, partly because they don't know.
- Who they buy similar seafood products from now (this will help you learn who your competitors are so you can determine what your strengths and weaknesses are).
- How you could help them meet their needs better (for example, better service, higher quality, better price, better product forms).
- How they like to buy products (for example, would they want to buy your products directly from you, or would they prefer to buy them from a distributor).
- Their typical payment terms. (Do they pay in 15 days? 30 days? By letter of credit?)
- The type of inspection of your product they require.



Some Western Alaska Village Fish Processing Plant Products



Freshly sliced king salmon strips produced by Dainty Island Seafoods



Hot-smoked vacuum packed salmon produced by Yukon Delta Products in Emmonak.



Yukon King Seafoods traditional salmon strips, produced by Maserculiq Fish Processors in Marshall. This product won the Grand Prize in the 2001 Alaska Symphony of Seafood.

Developing a Marketing Plan

After you have done your preliminary market research by learning about the market and talking to buyers, you should develop a marketing plan. This marketing plan should be an important part of decision about whether or not you decide to build or operate a fish plant. Don't make the all-too-common mistake of looking for a market after you've built your plant and started operating.

As you prepare your marketing plan, make every effort to be conservative in your projections. People you talk to may be optimistic in their projections, whether it's the price they will pay for your product or the amount of your product they might want to buy. It's much better to have positive surprises than negative ones.

Your marketing plan should include:

- **A Description of Your Market.** This will include a list of your most likely customers, the products they are likely to buy, and the volume they are likely to buy. What geographic region are you targeting (your local region, other parts of Alaska, markets in the Lower 48, markets in other countries)? What kinds of buyers will you target (food distributors, seafood markets, grocery stores, casinos, gift shops)? As you think about your market, remember that it is critical to have more than one customer!
- **Market Trends for Your Products.** What kinds of prices are your potential customers presently paying for the kinds of products you will produce? What is the price trend over the past few years for the kinds of products you will produce? What kinds of people are the end customers for these products? Are the markets for these products growing, shrinking, or stable?
- **A Pricing Strategy.** You should think about the best way to price your products compared with your competitors. If you believe your quality is higher than your competition, you will probably want to price your product higher than your competitors' products. On the other hand, if you can produce fish at a lower cost, then you may want to price your fish lower than your competitors' products, so you can have a competitive advantage.
- **Competitive Analysis.** You should describe who your competitors in the market are and your strengths and weaknesses compared with them. Think about why a buyer would buy from you instead of another processor.
- **A Marketing and Sales Strategy and Budget.** How will you make potential customers aware of your company and your products? What will it cost you? Marketing takes money and you'll have to include money in your budget for activities such as advertising and participating in trade shows.
- **A Payment Strategy.** What payment arrangement and terms will you establish with buyers? How will you protect yourself against buyers who pay slowly or don't pay?



Without a good customer list, you don't have a business.
—An experienced Alaska fish processor

Sometimes you just have to start making connections. Some people call it the 2% rule: you have to go through 100 people to get 2% positive response. Word of mouth is a good way to start, from somebody that maybe everybody knows or has heard about.

—An experienced western Alaska processor and buyer

You have to spend quite a bit of time doing the research. And you will get rejected. You'll have people say "I'm not going to talk to you." It's not my job to educate you. Come down here and figure it out yourself. There will be people like that. But every now and then you'll find somebody who will speak to you.

—An experienced Alaska fish processor

It's good to have more than one buyer. Have as many as possible, because they could have different needs; and some could be indifferent and some could need the fish desperately and be willing to pay more. Developing several relationships is really key.

—An experienced western Alaska processor and buyer

Our #1 fish on the fresh market sells well. The biggest problem we're having right now is that our #2 fish is devalued to where you don't make any money at all—you almost have to give the fish away to get rid of them. So now we hope to use the number two fish in our smoking operation. That could help our profitability.

—A village fish processing plant operator



Do you have a marketing plan?

Planning How You Will Sell Your Products

Selling fish costs money. Some seafood processors figure it costs them as much as 25 cents a pound in salary and overhead to sell their fish. So make sure you plan for the costs involved in selling your fish.

How much it will actually cost you to sell your fish—as well as the prices you get—will depend on your sales and marketing strategy. It may make sense to have an in-house sales person employed by your company—if you will be selling large enough volumes at high enough prices to cover this overhead cost. Another alternative may be to have a partner in your business whose main expertise and responsibility is sales and marketing. In either case, the person should be based where he or she can easily meet with your customers—perhaps in Anchorage or Seattle.

Or it may make more sense for your company to sell its fish through brokers or traders. Many smaller processors decide that this is the best strategy for them, since it reduces the time and money company management has to spend hiring and managing an in-house sales staff. Be sure to factor into your business plan the fees that brokers typically charge. Their commission fees will typically range from 3 to 7 percent of the value of the seafood they sell.

Regardless of what sales strategy you decide is best for your fish plant, you need to understand that fish doesn't sell itself. Seafood buyers have a lot of alternatives and you will have to work hard to find and keep markets.

Choosing People to Sell Your Fish

It's not easy finding good people to sell your fish. It is important to understand that selling seafood successfully depends, to a great degree, on the relationship a sales person has with a buyer. Buyers will often buy mostly from people with whom they have good relationships. To a certain extent, this is human nature. That is why good sales people tend to be very outgoing and friendly.

Most seafood companies will hire sales people or brokers that already have a good track record selling the kinds of products they produce. This is generally a low-risk proposition, as these people will already know who the buyers are for these products and they will have good relationships with many of these buyers. Depending on the types of products you produce, this may be best for your company.

However, you may also want to consider hiring someone who is new to the seafood industry, if your sales position requires a lot of new market development. Sometimes people who are new to the seafood industry will be more motivated and will work harder at developing new markets for your products. While experienced seafood sales people can be quite good at selling to buyers with whom they already have relationships, they are often not willing to make a lot of the "cold calls" needed to find a lot of new buyers.

Keep in mind that by their very nature, sales people tend to be optimistic. If you are interviewing prospective brokers or a sales persons, for example, they will probably tend to give you overly optimistic sales projections. They are in effect trying to sell you that they are the best for the job. While that may be true, it's wise to discount any projections you get from sales people before putting them in your business plan.

Before you select a person to sell your fish, be sure to take the time to do some background checking. As references, you should ask for a list of customers the person has been selling to. Then call these people to see what they have to say about the person you want to have represent your company.

Hiring the right people to sell your fish is critical to the success of your company. Make sure you go about this task carefully. It could make or break your company.



The Yukon has Alaska's best salmon—but it's Alaska's best kept secret. Copper River has the reputation, but people ask: "the what-kon?" It's an uphill battle. If you start out here with the mentality "I'll build it and they will come" you might starve to death while you wait. Our sales guy was trying to operate out of the village. But that doesn't work. You've got to have somebody meeting with people in town.—A Yukon River village fish processing plant manager

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What products will your plant produce?

What markets will you sell to?

What prices do you expect to receive?

Who will your competitors be?

What advantages and disadvantages will you have with respect to your competitors?

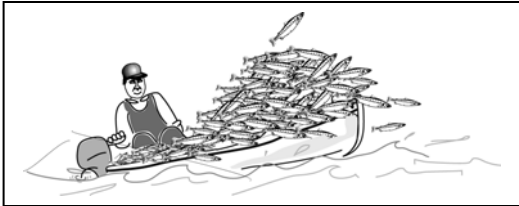
Who will sell your products?

What will it cost you to sell your products?

CHAPTER 6. BUYING FISH

Fish Resources

A fish processing plant can't succeed unless it can get fish to process. Fish runs and harvests can change a lot from year to year. So in planning a fish plant, you need to think carefully about the fish resources in your area and how they may change in the future.



It may not be easy to predict how runs may change in the future. Even the Department of Fish and Game only makes projections for one year in the future. But the success of your plant will depend on more than just one season, so you need to make the best guesses

you can about future fish runs. Talk to the Fish and Game biologists. Talk to the elders in your area who have been fishing for a long time.

The volume of fish that might be available for you to buy will depend on more than just the run size. How the fishery is managed will also matter. Changes in the commercial fishing regulations and the subsistence fishing regulations can affect when the fishery is open and how much fishermen will be allowed to catch. So you also need to think about how management might change.



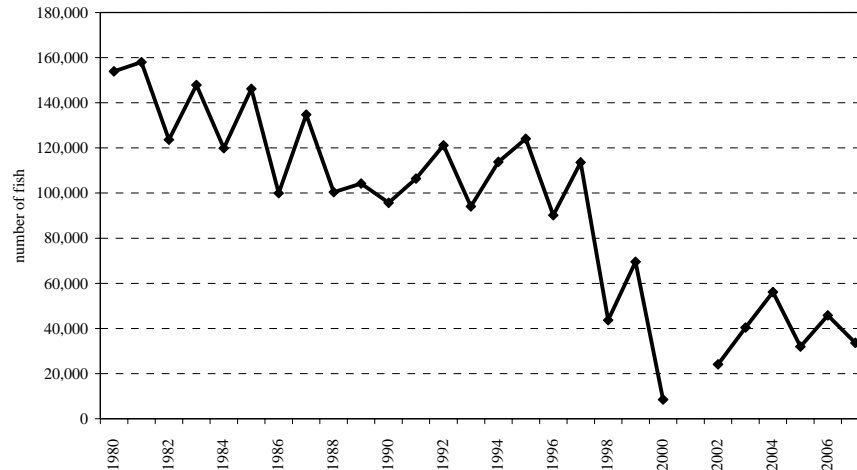
Village fishermen watch as their catch is weighed at the Mekoryuk halibut processing plant (1994).





The disastrous Yukon River salmon returns in 2000 and 2001 were a reminder of one of the risks faced by village fish processing plants. A processing plant can't make money unless it can get fish to process.

Alaska Catches of Yukon River Chinook Salmon, 1980-2007



Source: United States and Canada Yukon River Joint Technical Committee, "Yukon River Salmon 2007 Season Summary and 2008 Season Outlook," Alaska Department of Fish and Game Regional Information Report No. 3A08-01 (March 2008).



The Salmon Disaster and the Kaltag Fish Plant. These two stories from the *Anchorage Daily News*—written just two years apart--help show how lack of fish can change the outlook for a fish plant.

April 18, 1998:

Kaltag Fisheries Association said it has secured more than \$1 million in federal grants to build a seafood processing plant that could be operating as soon as next year. . . Richard Burnham, a fisheries association member, said an existing plant . . . will be obsolete under stricter processing rules imposed by the Department of Environmental Conservation. Plans call for a concrete and steel structure that should satisfy regulators, he said. "It'll allow us to not only do things with the (salmon) egg roe, which is our primary product right now, but also start utilizing the fish and doing more value-added-type things," Burnham said.

September 11, 2000:

So few salmon swam upriver this year that some villagers are wondering whether the plant will have to be mothballed before it slices its first fillet. "We took for granted that the fish were always going to be here," Mayor Violet Burnham said. "Now we have to think there may not be fish, and what are we going to do?"

Competition



Having good fish runs doesn't necessarily mean there will be enough fish for your plant. Having a fish processing plant in your village doesn't guarantee that fishermen—even the fishermen from your village—will sell their fish to your plant. Other buyers may compete with you for fish.

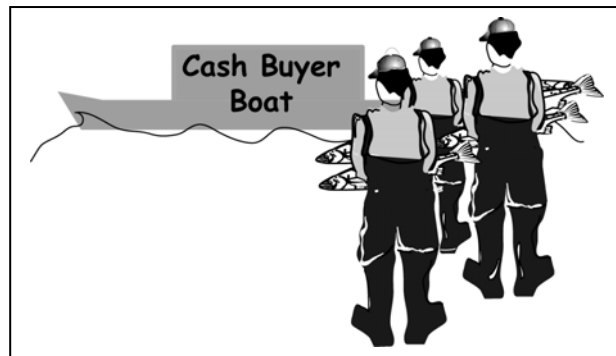
Other fish buyers in your area will want fish just as much as you do, especially if runs are low. So you need to think about how you will compete with other buyers. You will probably

need to pay the same or better prices as other buyers offer fishermen. You will need to offer the same or better services such as tendering and loans.

Established buyers who have bought fish in your area in the past will have advantages over you at first. One reason is that they already have experience in processing and marketing salmon from your area. Another reason is that fishermen who have dealt with them in the past may have greater confidence that they will get paid when they deliver to established plants than when they deliver to a new company. Fishermen may feel that they need to keep delivering to plants if they have received loans from them.

Sometimes competitors may only operate at the peak of the season, when the fishing is best. This may cut into your fish deliveries when processing can be most profitable.

Even if there isn't any competition at the moment, there might be in the future—particularly when markets are strong or when fish runs are low.



Your competition won't necessarily be limited to buyers from outside your area. It may also include other village fish processing plants. In most parts of Alaska there are enough fish for some villages to have successful processing plants. But there aren't enough fish for *every* village to have a successful fish processing plant.

The Community Development Quota (CDQ) program has brought important new players into the western Alaska fish processing business. A specific purpose of the CDQ program is to promote fisheries-related economic development in western Alaska, and several CDQ groups have invested in fish processing plants. Many of the plants operating in western Alaska north of Bristol Bay are now owned by CDQ groups.

Creating jobs and providing markets for fishermen are important goals for CDQ-owned plants. Because these plants have financial backing from CDQ groups, they do not necessarily have to earn a profit or even break even. Even if CDQ-owned plants aren't profitable, they benefit the communities where these plants are located and the fishermen they buy from—as the CDQ program was intended to do.

CDQ-owned plants can represent a major competitive challenge for non-CDQ owned plants in western Alaska which have to cover all of their costs. It's harder to compete successfully for fish if your competitor doesn't have to break even and you do.



Who will you be competing with to buy fish?

Will fishermen be willing to sell you the volume of fish you plan to buy?



Competing with Cash Buyers. Here's how the former manager of a western Alaska village fish plant described competition from cash buyers:

Fish buyers started seeing the reputation of the quality of the fish we had. Cash buyers started coming in. They started setting up shop right at the mouth of the river, where they would just set up signs. If we were paying \$.75/lb for kings they had signs over here saying "\$.80/lb cash."

Whereas we were financing fishermen. We bought their nets, we bought their boats, we bought motors, we bought gear for them—so we had accounts receivable from fishermen. So when they come to deliver to the fish plant 50% maybe of their delivery would go their account, so they'd only get half the money.

But with the cash buyer there's a sign saying a penny or two higher. But it would be cash. So that would be lucrative for them. And they came in basically for the kings or the cohos and then they were gone. We ended up with all the low-value fish, the chums and the pinks. We had overhead, we had loan payments, whereas the cash buyer he'd get their fish and fly them out and recover all of that. So we just couldn't beat the cash buyers, couldn't compete with them, with our higher overhead and higher operating costs.



Competition for village fish processing plants:
Bering Sea Fisheries operation on the Lower Yukon.



Fish Quality

As competition increases in world fish markets, quality standards for fish products are rising. Finding and keeping a good market for your fish will depend on delivering consistently high quality products. To make good quality fish products you need to start with good quality fish. In many parts of Alaska, that means changes in how fishermen handle fish, shortening the time period between when fish are harvested and when they are delivered and icing the fish to keep them cool. Fishermen may need training about what they need to do to deliver good quality fish. They may need ice. They may need new equipment, such as totes to hold iced fish.

It may not be easy to get fishermen to meet your quality standards. If you insist on higher quality standards than your competitors, some fishermen may stop delivering to you. It may difficult to refuse to buy from fishermen from your village who aren't meeting your quality standards. But it is absolutely necessary to maintain strict quality standards—and to try to raise them over time.

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How will you make sure that fishermen deliver good quality fish to your plant?

What will fishermen need to do in order to deliver good quality fish?

What will you need to do to make sure that the fishermen you are buying from meet these quality standards?

If you provide ice to fishermen, what will it cost you per pound of delivered fish?



It's important to have enough unloading capacity so that you don't have delays at the dock like this picture shows. Fish sitting in a boat are deteriorating in quality. Keeping the fish iced in slush bags or totes is essential. You need a boat that can provide ice to fishermen on the grounds or while they are waiting to deliver. Long waits are also tough on fishermen's patience. If there's another buyer available, they may look to the competition.



Fish Prices

The cost of fish is one of the biggest costs of a fish-processing plant. In planning your plant, you need to think carefully about what you will need to pay for your fish.

That may be different from what fish buyers in your area paid this year or last year. Fish prices change from year to year. Fish prices in the future won't necessarily be the same as they have been in the past. In planning for your plant, you need to think about how and why fish prices may change.

Fish prices are affected partly by local conditions in your area. When your plant opens your competitors may bid up the price to try to maintain their market share. In a low harvest year they may bid up the price to try to get enough fish to operate profitably—or they may sit out the season and not buy any fish.

Fish prices are also affected by market conditions for the products you and your competitors produce. If other buyers in your area are getting good prices for their fish products, they are likely to raise the prices they offer fishermen to try to get more fish. You will probably have to match the prices offered by other buyers (but be careful not to match prices until you're sure they're what other buyers are actually paying).

What you assume about the prices you will have to pay fishermen should be consistent with your assumptions about the prices you will get for your fish products. If you get a high price for your products, other buyers will probably also be getting high prices, and chances are the fish price will go up. If you get a low price for your fish products, other buyers will probably also be getting low prices, and chances are the fish price will go down. So one way to think about fish prices is to think about the spread—or margin—between the wholesale price for fish products and the ex-vessel price paid to fishermen. The margin will probably stay about the same in the future as it has in the past.



What price do you expect to pay for fish?

In the past, what has been the typical “margin” between what processors in your area got paid for fish and what they paid fishermen?



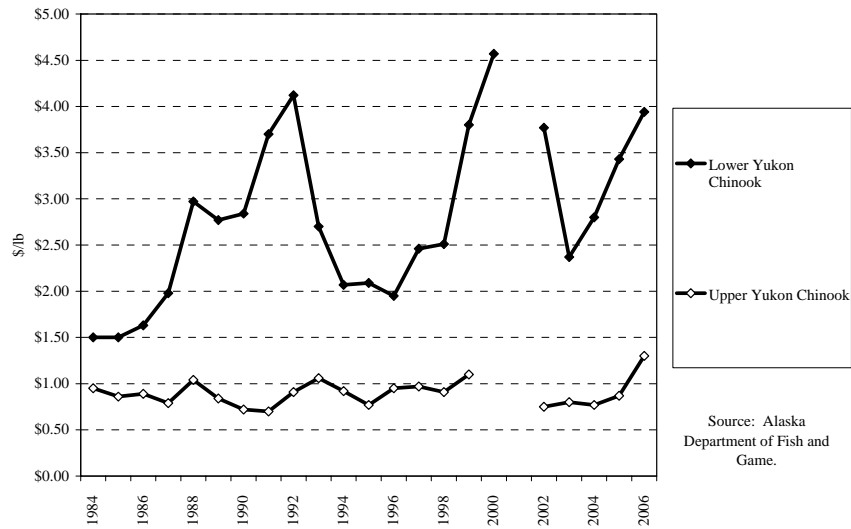
A different perspective on fish prices

The establishment of the Alaska CDQ program in the 1990s put some Alaska Native small boat fishermen in new ownership and management roles. Traditionally they had believed that large fish processors were taking advantage of them on the price they paid for fish. When the fishermen became fish buyers, they realized that many factors affect the price of fish and that a low price is not necessarily an unfair price.



Prices processors pay to fishermen vary from year to year. Markets vary for different species. As these Yukon River prices show, the recent past is not necessarily a guide to price conditions in the future.

Alaska Prices Paid to Yukon River Fishermen for Chinook Salmon, 1984-2006

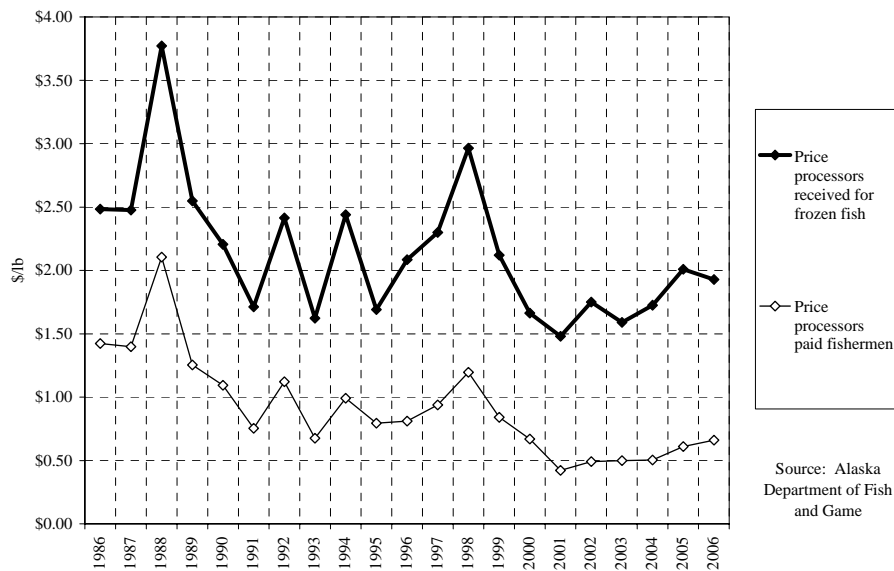


Source: Alaska Department of Fish and Game.



Fishermen's prices reflect the wholesale prices received by processors. If you get higher wholesale prices, you will probably pay fishermen more. If you get lower prices, you will probably pay fishermen less.

Average Bristol Bay Sockeye Salmon Prices



Source: Alaska Department of Fish and Game

Delivering Fish to the Plant

Part of buying fish is getting them to the plant. If your plant is close to where the fishermen are catching the fish, they may be able to deliver the fish to the plant directly. Otherwise, you may need to provide tendering (or trucking, if the fish are being caught by set-nets).

As part of your financial planning, you will need to estimate what tendering will cost you per pound. This will depend partly on whether you contract with someone else to do your tendering for you, or whether you operate your own tender boats.

Remember, in a low-run year, your tendering costs per pound may be higher than in a high-run year. It costs almost as much fuel and time to pick up a few fish as a lot of fish. So the tendering cost per pound should vary between a low-run and a high-run year. In some years it may be more cost-effective to pay a higher price for dock-side delivery rather than paying a tendering fleet.

? *How will fish get delivered to your plant?*

Will fishermen deliver to tenders or directly to the plant?

If they use tenders, will you use your own tender boats or will you contract for tenders?

How much will tendering cost you?

Season Timing

You can't plan a fish plant just by thinking about the total volume of fish you will buy over a whole season. You also need to think about *when* you will be buying and processing fish. What months will your fish plant be operating? How much fish are you likely to buy each week? Will your buying and processing be spread out evenly over the week or will you get all the fish in one day? The answers to these questions will affect how much space and equipment you need in your plant, how many processing workers you will need, and how long you will need them.

? *What will be the timing of your fish plant production?*

What is the timing of fish runs in your area? When will fishery openings occur? What are the peak periods of the season?

What is the highest volume that might get delivered to you in a day?



Tender boats owned and operated by the Yukon Delta Fish Marketing Coop in Emmonak (top) and Maserculiq Fish Processors in Marshall (bottom)



Fish Taxes

Part of your costs in buying fish will be fish taxes. The State of Alaska has several different kinds of taxes paid by fish processors and fishermen. A village fish processing plant has to pay two kinds of taxes:

- The **Fisheries Business Tax** is paid by businesses that process fish. The Fisheries Business Tax rate for shore-based plants is 3% of the value paid to fishermen (except for canned salmon, for which the tax rate is 4.5%).
- The **Seafood Marketing Assessment** is paid by Alaska seafood processors with more than \$50,000 in annual sales to support the Alaska Seafood Marketing Institute (ASMI). The rate is 0.5% of the value of seafood products produced in Alaska.

So the combined tax rate paid by most village fish processing plants is 3.5% of the value paid to fishermen.

You can get more information about these taxes, as well as copies of the tax forms, from the Alaska Department of Revenue's web-site at www.tax.state.ak.us/divisions/fisheries.htm.

In some parts of Alaska, such as the Bristol Bay Borough, local governments also collect fish taxes. Be sure to include any local fish taxes in your area.

- **? What percent of ex-vessel value (the price you pay fishermen) will you have to pay in fish taxes?**

CHAPTER 7. BUILDINGS AND EQUIPMENT

The buildings and equipment you need for your plant depend on how much fish you plan to process and what products you plan to produce—which should be based on your fish resources and on the markets and costs for different products. You should think carefully about your fish resources, markets and costs *before* you build your plant.

It takes experience and expertise to design and equip a fish plant. You will probably need advice. Make sure you get advice from people who understand fish processing, who understand Alaska construction and fish processing regulations, and who understand the special conditions in building and operating processing plants in Alaska villages. Watch out for people who may be more interested in selling you something than in giving you good advice.

Plant Capacity

Your plant design should be based on the daily production capacity you want for different kinds of products. You don't want your capacity to be too low to handle the fish you will be buying. But you also don't want to have more capacity than you will use, because then you will be paying more than you need to for buildings, equipment, maintenance, and utilities. You may wish to allow room to expand your capacity in the future as you gain experience and develop markets.

Conditions change from year to year, and so your plant capacity will never be perfect for your needs. Even if you design your plant well, some years you will still have too much capacity and other years you won't have quite enough capacity. But you will avoid losing big opportunities by having far too little capacity, or losing big money by having far more capacity than you can use.

Even if some value-added products are highly profitable, you shouldn't necessarily install enough capacity to process all your fish into these products. The more money you spend on expensive value-added processing equipment, the greater the risks you face of losing money if prices or runs turn out different from what you expect. If you can produce a range of products, you can adjust more easily to different run and market conditions.



What will be the capacity of your plant?

How much fish do you want to buy and process on an average day, and at the peak of the season?

What capacity will use equipment and machinery most efficiently?

How will availability of funding to start and operate your plant affect the capacity you can afford?

Have you considered starting small and adding capacity in the future?



Will you be able to buy enough fish to use the capacity you are planning for efficiently?

Will you have enough capacity to handle the fish you plan to buy?

Plant Location

Location is very important for a fish processing plant. Your plant should be in a good location for getting fish from fishermen or tenders into the plant. It should be at or near a good landing area or dock. Be sure to think about how weather or other factors may affect the landing spot. Is it protected from winds? Do tides or river levels affect or limit the suitability for landing fish? If the location is on a river, what is the flood danger?

Similarly, the plant should be in a good location for getting product from the plant to the transportation out of the village. If the product will be shipped by barge, is the location convenient for loading large craft? If the product will be shipped by air, is the plant close to the airport? Your labor costs will be higher the more time it takes for a crew to get to the airport. Does the route to the airport avoid busy village streets? Running flatbed trucks through a village, with kids playing and people walking in the road, can be a real safety hazard. Also, heavier vehicles can be hard on the road surfaces.

Your plant should be located at a place with good, firm ground to build on. If the ground is wet or there is permafrost, your plant will need to be on a gravel pad or pilings, which will add to the cost.

The location should have access to the utilities that are essential for a fish plant: electricity, water, and waste disposal.

The location should have room for possible future expansion of the plant, such as storage areas for vans, and other additional equipment that can come with a successful operation.

The location should be at a location which is acceptable to the community, and which doesn't conflict with other uses of or plans for the area.

Avoid the temptation to locate your plant where the land is cheap or easy to get—but which won't work well for a fish plant.



Where will your fish processing plant be located?

Is the location good for bringing in fish and shipping out product?

Are the soil conditions suitable for building a fish plant?

Does the location have access to electricity, water and waste disposal?

Is there enough space for the operation now, and for growth in the future?



Make sure the land is legally yours.

It is vital to own the land you are going to build on or to have legal control over it for the period of time you hope to operate your plant. Sydney Huntington, a successful small producer of traditional smoked salmon strips, established his operation on Dainty Island, which was his traditional fish camp. The Alaska Department of Environment Conservation regulations applied to Sydney's product and required that he upgrade his plant. Sydney used his own money for the upgrades but also applied to federal and state agencies for grant money. He discovered that he could not qualify for grant money because he did not own or legally control the land that was his fish camp site. Eventually he was able to lease the land and get grants to help build his plant—but it took a year or more to get the lease.

Building Design

There are many factors you need to take into account as you design the building or buildings for your processing plant. First, make sure that the building complies with regulations for the construction of fish plants, especially Alaska Department of Environmental Conservation (DEC) regulations. Make sure that you get advice from someone who understands these regulations. (For more information about DEC regulations, see Chapter 8 of this handbook.)

Second, plan your building to include all the spaces you will need. These may include spaces for:

- Offloading and storing unprocessed fish
- Processing
- Blast freezing or chilling
- Packaging
- Cold storage
- Storing other products not kept in cold storage
- Storing packaging and supplies
- Quality testing
- Lavatory, laundry, and eating room facilities
- Utility equipment (heat, hot water, well water, electric)
- Office

If you bring in workers from outside your village, you may also need a bunk house and a mess hall to house and feed these workers.

Third, plan your building so that the different spaces fit together in a way that is efficient and convenient. Make sure that fish move smoothly through your plant from when they are offloaded through processing, freezing, packaging and storage. Make sure that activities that might introduce contamination are separated from processing. Spaces where you handle raw fish need to be physically separated from spaces where you handle final product. This is particularly important for ready-to-eat products such as smoked fish, jerky or pickled products.

In general, there are three ways to get a building for a village fish processing plant:

Taking over an existing building and modifying it to meet your needs. This may seem like a cheap way to start a processing operation. But it may not be a good deal if the building is not well-suited for your needs—if it is too small or too large, if it requires a lot of maintenance, if it's not in a good location, or if it's not well designed for your production process.

Barging in a pre-fabricated structure. In some cases, particularly for smaller operations, it may be cheaper and easier to build a plant somewhere else, for example using 20' or 40' vans, and then barge it in with the equipment already installed in it.

Building a plant at the site. This gives you the advantage of being able to build a plant that will best meet the needs of your operation and the characteristics of the building location. But it may be more expensive and difficult to build than a pre-fabricated plant.

As part of your planning, you should draw a diagram showing where different activities will take place in the plant and where different pieces of equipment will be located.

Appendixes C, D and E provide three examples of processing plant designs that could be suitable for village fish processing plant operations. Appendix C provides a design for a prefabricated plant built from two 40' vans. Appendix D provides a design for a plant built in the village. Appendix E provides a design for a salmon egg (sujiko) processing room. None of these designs may be suitable for your specific circumstances, such as your capacity needs and the products you wish to make. But they help to illustrate the kinds of things you will need to think about in designing your own plant—particularly making sure there is room for everything that needs to happen in the plant, and that fish, supplies, and people can move through the plant in an efficient and effective way

Thinking carefully about your processing operation when you are designing your building can save you big headaches later on.

The United States Food and Drug Administration (FDA) issues “Good Manufacturing Practice” regulations which apply to all food manufacturing operations in the United States, including seafood processing. Here are the regulations which apply to plant construction and design:

Subpart B--Buildings and Facilities, Sec. 110.20 Plant and grounds.

(b) **Plant construction and design.** Plant buildings and structures shall be suitable in size, construction, and design to facilitate maintenance and sanitary operations for food-manufacturing purposes. The plant and facilities shall:

(1) Provide sufficient space for such placement of equipment and storage of materials as is necessary for the maintenance of sanitary operations and the production of safe food.

(2) Permit the taking of proper precautions to reduce the potential for contamination of food, food-contact surfaces, or food-packaging materials with microorganisms, chemicals, filth, or other extraneous material. The potential for contamination may be reduced by adequate food safety controls and operating practices or effective design, including the separation of operations in which contamination is likely to occur, by one or more of the following means: location, time, partition, air flow, enclosed systems, or other effective means.

(3) Permit the taking of proper precautions to protect food in outdoor bulk fermentation vessels by any effective means, including:

(i) Using protective coverings.

(ii) Controlling areas over and around the vessels to eliminate harborages for pests.

(iii) Checking on a regular basis for pests and pest infestation.

(iv) Skimming the fermentation vessels, as necessary.

(4) Be constructed in such a manner that floors, walls, and ceilings may be adequately cleaned and kept clean and kept in good repair; that drip or condensate from fixtures, ducts and pipes does not contaminate food, food-contact surfaces, or food-packaging materials; and that aisles or working spaces are provided between equipment and walls and are adequately unobstructed and of adequate width to permit employees to perform their duties and to protect against contaminating food or food-contact surfaces with clothing or personal contact.

(5) Provide adequate lighting in hand-washing areas, dressing and locker rooms, and toilet rooms and in all areas where food is examined, processed, or stored and where equipment or utensils are cleaned; and provide safety-type light bulbs, fixtures, skylights, or other glass suspended over exposed food in any step of preparation or otherwise protect against food contamination in case of glass breakage.

(6) Provide adequate ventilation or control equipment to minimize odors and vapors (including steam and noxious fumes) in areas where they may contaminate food; and locate and operate fans and other air-blowing equipment in a manner that minimizes the potential for contaminating food, food-packaging materials, and food-contact surfaces.

(7) Provide, where necessary, adequate screening or other protection against pests.



What type of building will you have?

How big will it be?

Where will each activity occur?

How will fish move through the plant?

Who will build it? When will they build it?

Equipment

At the same time as you plan your building you need to plan for the equipment you will use for processing. As with the design for your building, it is important to get good advice about what equipment will make the most sense for your processing plant. The equipment that is best for your plant is not necessarily what is best for other plants in other places. What is best for you depends on many different factors, including how much space you have, the cost of power, how many workers you have and their skill levels, and the volume of fish you wish to process.

An important decision in the design of your plant is whether you should install freezing equipment. You can save money if you don't, but you will also greatly reduce your options as to what products you can produce and when you can sell them. Be sure to get good advice about what kind of freezing equipment is best for your operation.

Should you have a freezer?	
No	Yes
Lower equipment costs Lower utility costs Lower cold-storage costs Immediate sales	More flexibility More product and market options Ability to sell when the price is right
<i>But</i>	<i>But</i>
Less flexibility Risk of not getting product to market in time Fewer market options Risk of having to sell even if the price is low	Higher equipment costs Higher utility costs Cold storage costs Interest costs on stored fish Risk of freezer breakdowns



Another important choice is whether or not you should buy labor-saving machines such as a filleting machine or a pin bone-pulling machine. These machines have several potential advantages for a village fish processing plant. They can process much larger volumes of salmon than is possible manually. A single machine operated by three non-skilled workers can do the work of five skilled filleters. This not only reduces the labor requirements for your plant, but also the risks associated with injuries, carpal-tunnel syndrome, and absenteeism. It also reduces the need to pay, house and feed skilled workers even if you can't keep them fully employed all the time.

Machines can also save you money on air transport costs, because the product weight that you are shipping is lower. They can allow you to produce products that command a higher wholesale value and may be of greater interest to buyers. They may be your only option if the market demands fillets.

However, these machines also represent a significant expense. The cost per fish of using the machine depends on how many fish you are processing and the reliability of the machine. If you are only processing a small volume the cost per pound of fish may be high. If you rely on a machine as a critical part of your processing operation, it can be costly if it needs constant maintenance or adjustment, and very costly if it breaks down.

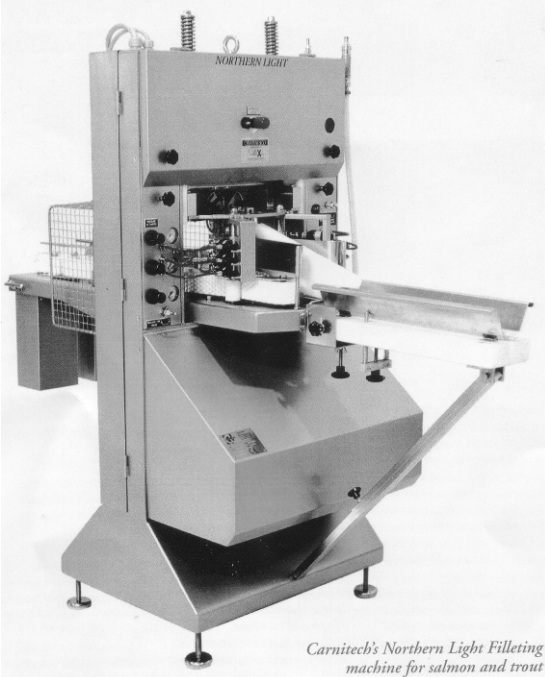
You should carefully compare the cost of the machine with the amount of money you can save on labor costs and air freight. You should also compare the product yield with and without the machine, the quality of the product, and how having the machine might affect your production capacity. It is also very important to learn about how much maintenance the machine requires, how reliable it is, and what kind of training is needed to maintain it or fix it if it breaks.

Hand Labor or Machines?	
Hand labor	Machines
<p>Lower equipment costs Lower utility costs</p> <p style="text-align: center;"><i>But</i></p> <p>More skilled workers needed Higher labor costs Higher transport cost Lower capacity Greater risk of worker injuries or absenteeism</p>	<p>Fewer skilled workers needed Lower labor costs Lower transport cost Higher capacity</p> <p style="text-align: center;"><i>But</i></p> <p>Higher equipment costs Higher maintenance costs Higher utility costs Risks of machine breakdown</p>



Examples of filleting and pin bone-removing machines potentially suitable for use in village fish processing plants. More information about these machines is available at www.carnitech.com.

Carnitech Filleting Machine CT 2611



Carnitech's Northern Light Filleting machine for salmon and trout

Carnitech Pin Bone Remover CT 2612



A defrosting/chilling tote is a recent innovation that can greatly help in maintaining quality by providing a way to quickly bring down the body temperature of fresh salmon. Spouts in the bottom of the container are used to pump compressed air through slush ice. It can also be used as a defrosting container, greatly reducing the time needed to thaw frozen salmon for value-added processing.

Commercially available Saeplast defrosting/chilling tote (approximate cost \$1600)



Interior of a standard 1,000 lb tote converted to a chiller tote by Doug Drum of Indian Valley Meats, at a cost of less than \$50 for tubing and connectors.





The more equipment you purchase, the more problems you purchase. This summer we've got a specialist on refrigeration, an electrician, and an engineer. These guys are costing us \$600 per day, and then you've got airfare and all the rest. Compare that with Sydney Huntington's operation, where one guy basically did it all himself.

—A village fish plant manager.

You're dealing with a perishable product. And if you're down for a couple of days, the fish can't be allowed to stack up. What do you do with them? You still have to have the conventional fallbacks.

—An experienced Alaska fish processor.



Not every freezer is right for your plant.

In the mid-1990s, a small fish processing plant in a western Alaska village bought a “package deal” of several kinds of equipment. The equipment included a freezer that used a special freezing fluid which was expensive and difficult to obtain. The plant was unable to use the freezer and had to discard it.

A fish processing plant in southcentral Alaska bought a high-capacity immersion freezer which used liquid nitrogen to freeze fish very quickly. While this kind of freezer works very well for small fish, it didn't work well for salmon, because it froze the outsides of the fish too quickly, so that the fish twisted and cracked from the pressure as the insides froze.



What type of equipment will you use?

For each type of equipment:

What will it cost?

Where in the plant will it be located?

How much power will it use?

Who will maintain it?

Do you have to have it or could you do without it?

Equipment Costs

The table on the following three pages lists some of the kinds of equipment you may wish to buy and approximate costs for new equipment. These prices are from suppliers' catalogues or from equipment suppliers listed in the references at the end of the handbook. The prices do not include the cost of freight for getting equipment to the village. Remember that equipment prices vary, depending on the manufacturer and the distributor. Used equipment is also often available and can be 50% to 60% of new cost.



Equipment and supplies cost money.

Marshall plant ice-making equipment. A new 5-ton ice machine may cost \$55,000.



Marshall plant totes. Totes may cost \$300 each.



Loading Quinhagak plant wetlock boxes on a plane. Wetlock boxes may cost \$7.00 each.



Unalakleet plant conveyor belt. A conveyor belt system may cost thousands of dollars.



Example of Equipment Costs for a Hypothetical Village Processing Plant

<i>Activity</i>	<i>Type of equipment</i>	<i>Unit cost (new)</i>	<i>Quantity</i>	<i>Total cost (new)</i>
Receiving	Crane (Electric hoist & generator)	\$12,000	1	\$12,000
	Crane (2 ton hydraulic)	\$23,000	1	\$23,000
	Brailer	\$350	1	\$350
	Scale	\$3,000	1	\$3,000
	Slush-ice bag release	\$250	1	\$250
	Tote (insulated - 1500 lb)	\$400	100	\$40,000
	Forklift	\$28,000	1	\$28,000
	Tote keeper for forklift (dumping)	\$5,000	1	\$5,000
	Plastic Shovel	\$37	4	\$148
Holding	Ice machine - 5 ton (and enclosure)	\$55,000	2	\$110,000
	Ice machine - 10 ton (enclosed)	\$110,000	1	\$110,000
General processing	Tote dumper	\$12,000	1	\$12,000
	Pallet jack	\$600	1	\$600
	Double Hopper	\$10,000	1	\$10,000
	Feed chutes and receiving table	\$4,500	1	\$4,500
	Process line-belt conveyor (\$/foot)	\$850	15	\$12,750
	Process line-pocket conveyor (\$/ft)	\$1,800	1	\$1,800
	Rinse tank	\$3,000	1	\$3,000
	Table - grading with bins	\$3,000	1	\$3,000
	Boxing Roller - (5' X 2' section)	\$130	4	\$520
	Knives - 8"	\$28	24	\$672
	Steels	\$17	12	\$204
	Knife sharpener	\$220	1	\$220
	Hand truck	\$350	2	\$700
	Utility tub & lid	\$300	8	\$2,400
	Tub cart	\$400	8	\$3,200
	Sink-hand wash	\$330	1	\$330
	Sink-3 compartment	\$700	1	\$700
	Eye wash system	\$55	1	\$55
	Rubber mats (to stand on)	\$45	40	\$1,800
	H&G processing	Header - (automatic)	\$35,000	1
Fillet processing	Fillet machine	\$110,000	1	\$110,000
	Splitter	\$25,000	1	\$25,000
	Fillet line (belt driven)	\$800	10	\$8,000
	Pinbone machine (5-10 fish/min)	\$32,500	2	\$65,000
	Pinbone trim line (belt driven)	\$800	8	\$6,400
	Skinning machine - Trio - used	\$35,000	1	\$35,000
Smoking	Smoker-horizontal flow-500 lb cap.	\$56,000	1	\$56,000
	Smoker - verticle flow-500 lb cap.	\$45,000	1	\$45,000
	Fish screens (set of 14 half-screens)	\$1,600	1	\$1,600
	Extra truck and screens (14 tier)	\$3,000	1	\$3,000
	Chart recorder	\$1,200	1	\$1,200
Brining	Drum & lid (make/store brine)	\$75	2	\$150
	Dollies (6 tub capacity)	\$300	3	\$900
	Tub (brine fish)	\$7	15	\$105
Egg processing	Sorting Table	\$750	1	\$750
	Rubbing screen	\$2,000	2	\$4,000
	Catch basket	\$200	2	\$400
	Agitator	\$5,000	3	\$15,000
	Drain rack	\$1,000	1	\$1,000
	Grading table	\$750	1	\$750
	Packaging table	\$750	1	\$750

This table continues on the next page.

Example of Equipment Costs for a Hypothetical Village Processing Plant (cont.)

<i>Activity</i>	<i>Type of equipment</i>	<i>Unit cost (new)</i>	<i>Quantity</i>	<i>Total cost (new)</i>
Freezing/Chilling	Chiller	\$25,000	1	\$25,000
	Blast Freezer (20,000 lbs/day)	\$50,000	1	\$50,000
	Freezer/cold storage	\$45,000	1	\$45,000
	Freezer van - used (cold storage)	\$8,500	8	\$68,000
	Trucks & racks to hold fish	\$1,000	35	\$35,000
	Glazing bin (dip-spray)	\$12,000	1	\$12,000
	Gel machine with bag sealer 3	\$2,700	1	\$2,700
	Gel ice freezer	\$5,000	1	\$5,000
Canning	Retort with controls	\$21,000	1	\$21,000
	Retort boiler (used)	\$17,000	1	\$17,000
	Can seamer	\$21,000	1	\$21,000
	Cart dolly	\$110	1	\$110
	Hoist system	\$1,000	1	\$1,000
Meat cutting	Knives - 6" 2	\$20	6	\$120
	Knives - 12" 2	\$36	6	\$216
	Knife Scabbard	\$11	6	\$66
	Racks for holding utensils	\$25	1	\$25
	Band saw	\$5,000	1	\$5,000
	Saw blades	\$8	30	\$240
	Meat slicer	\$2,453	1	\$2,453
	Bench scale	\$970	1	\$970
	Spice scale	\$185	1	\$185
	Meat hand saw	\$60	1	\$60
	Hand saw blades	\$2	9	\$18
	Meat lugger (tub)	\$7	30	\$210
	Dollies-6 lug capacity (see brine)	\$300	1	\$300
	Dollies - 2 lug capacity	\$215	1	\$215
	Bone scrapers	\$6	2	\$12
	Block scrapers	\$4	4	\$16
	Ham pump (multi-needle injector)	\$1,600	1	\$1,600
Meat grinding/stuffing	Grinder	\$6,500	1	\$6,500
	1/8 inch plate (C1-32)	\$43	1	\$43
	3/16 inch plate (C1-32)	\$43	1	\$43
	1/4 inch plate (C1-32)	\$43	1	\$43
	Knives N1-32	\$12	1	\$12
	Mixer 100#	\$8,900	1	\$8,900
	Piston stuffer with table	\$17,500	1	\$17,500
	Stuffing horns	\$115	1	\$115
	Replacement part kit	\$500	1	\$500
	Roller	\$150	1	\$150
	Stick extruder	\$4	1	\$4
	Freezer paper dispenser	\$40	1	\$40
	Spice scoop - 6 oz	\$4	1	\$4
	Spice scoop - 12 oz	\$5	1	\$5
	Spice scoop - 64 oz	\$3	1	\$3
	Stainless steel zip tier	\$120	1	\$120
	Dial thermometers	\$13	6	\$78

This table continues on the next page.

Example of Equipment Costs for a Hypothetical Village Processing Plant (cont.)

<i>Activity</i>	<i>Type of equipment</i>	<i>Unit cost (new)</i>	<i>Quantity</i>	<i>Total cost (new)</i>
Packaging	Scale - bench (300 lb)	\$1,000	1	\$1,000
	Scale stand	\$500	1	\$500
	Strapping machine	\$1,200	1	\$1,200
	Max pac clipper	\$575	1	\$575
	Box Stapler	\$475	1	\$475
	Vacuum packer - double	\$17,500	1	\$17,500
Waste disposal	Grinder	\$10,000	1	\$10,000
	Offal transport system to grinder	\$3,000	1	\$3,000
	Outfall (100')	\$1,500	1	\$1,500
Office/Break room	Desk	\$400	2	\$800
	Tables - office	\$100	4	\$400
	Chairs	\$75	4	\$300
	FAX	\$250	1	\$250
	Computers	\$2,000	2	\$4,000
	Copier	\$500	1	\$500
	Printers	\$350	2	\$700
	Phones	\$200	2	\$400
	Filing Cabinets	\$200	3	\$600
	Book/Storage Shelves	\$200	3	\$600
	Coffee Pot - office	\$50	1	\$50
	Benches	\$100	10	\$1,000
	Tables - break room	\$100	5	\$500
	Industrial Coffee Pot	\$200	1	\$200
	Microwave	\$150	1	\$150
	Toaster	\$50	2	\$100
	Oven	\$1,000	1	\$1,000
	Stove	\$1,000	1	\$1,000
	Refrigerator/Freezer	\$1,500	1	\$1,500
	Dishware (sets of 4)	\$25	10	\$250
Flatware (sets of 4)	\$15	15	\$225	
Plastic garbage cans	\$15	3	\$45	
TOTAL				\$1,204,099

Note: The prices in this table are based on estimates by equipment suppliers. Prices vary greatly depending upon whether equipment is new or used. Although the table can give you a general idea of prices, you should check with suppliers in estimating your own equipment costs. The equipment listed in this table represents equipment commonly used in small western Alaska processing plants that operate most of the year processing both fish and meat, and also providing custom processing services for area residents. It includes some equipment used primarily for value adding and/or processing meat products. Specific equipment needs would vary depending upon product lines. Not all equipment listed in the table would be used by all plants.

Utilities

A fish plant uses a lot of water and a lot of electricity. It makes a lot of fish waste which has to be disposed of in ways that are strictly regulated. If the power goes off and you can't process fish or keep them cold, you can lose a lot of fish and a lot of money. If the waste disposal system isn't working, inspectors can shut the plant down.

Utilities are critical to your fish plant operation and a big part of costs. It is important to think carefully about utilities in planning your fish plant buildings and equipment.

Electricity

You can get electricity from your local utility or generate it for yourself. Often it is cheaper and simpler to buy power from a utility. If you generate your own power you take on an extra set of headaches associated with running and maintaining a generator—and a big risk if the generator stops working.

If you buy power from the local utility, make sure you get the right kind of power. Power may be single phase, V-phase, or three-phase. While single-phase power is adequate for most houses, three-phase power is usually used to operate power machinery, because it delivers power more efficiently.

If three-phase power is available, it's almost certainly the best way to power your plant, because it will lower your electric bills. If your local utility doesn't generate three-phase power or you can't get it to your plant, your next best option may be to convert single-phase power into three-phase power. You need special equipment to do this and it increases the cost of the power, because some of the power is used up in conversion.

If you are buying power from a local electric utility, you need to work out your power needs with the utility in advance, so that they can install the proper transformer. If you plan to expand your plant in the future, you will need transformer capacity to handle the large rise in demand that comes with ice machines or refrigerated vans. It can take weeks or months to have a transformer shipped to your village and installed—so be sure to think about your electricity load requirements well before the season.

Water

Processing can take a lot of water. As a simple rule of thumb, plan on using a gallon of water for each pound of fish you process. If you plan to use city water, does the city have the capacity to handle a big seasonal demand? If you plan to use well water, you'll need sanitizing equipment to meet DEC requirements, plus filtration equipment, if there's high mineral content in the local ground water.

Waste Disposal

It is important to think carefully about how you will dispose of fish waste. Your options may include grinding it and dumping it in a river or bay near the plant. You will need a fish waste discharge permit to dump it in the water. You won't be allowed to dump it near the plant unless there is a strong current or tide in the discharge area.

Fish processing produces a lot of grey water. You need to think about where your grey water will be discharged.

Your fish plant will also produce human waste. You will need to think about how to dispose of it, either by hauling it to a sewage lagoon or through a sewage line.

?

How will you get the utilities you need? What will they cost?

How much electricity will you need? How will you get it? What will it cost?

How much water will you need? How will you get it? What will it cost?

How much waste will you need to dispose of? How will you dispose of it? What will it cost?



Can you get the electricity, water and waste disposal you need at prices you can afford?

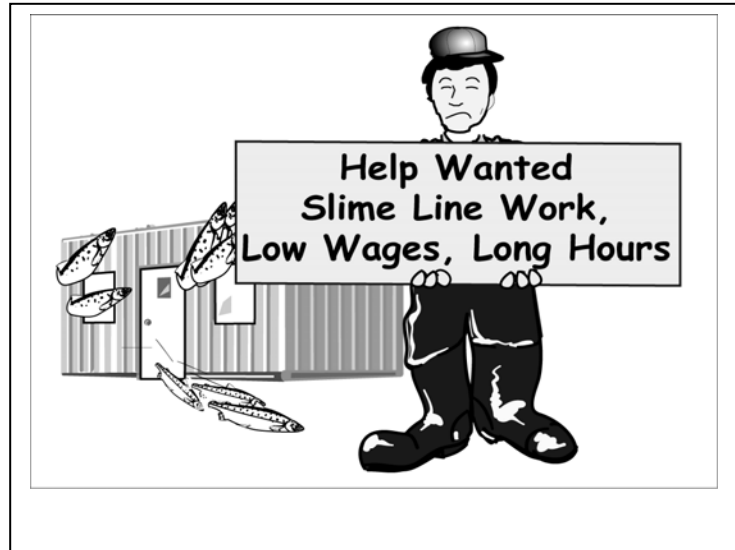
Can you get the permits you will need for water and waste disposal?

CHAPTER 8. PLANT WORKERS

A fish plant needs workers to process the fish. As you plan your plant, you should think carefully about how many workers you will need and where you will find them. Finding workers for a village fish plant can be difficult. Even though it's hard to find jobs in most villages, not everyone wants to work in a fish plant.

Fish plant workers have to be willing to work whenever fish are delivered, until all the fish are processed. If there are a lot of fish, the workers may have to work overtime and on holidays, bingo nights or other special days when most people would rather not be working.

You need to keep your costs low enough, so you most likely won't be able to pay your workers high wages. Probably you won't be able to pay much more than other fish plants pay.



If there are other job opportunities in your villages during the fishing season, people may prefer those jobs. The people with the most skills are also the most likely to have a chance to get other jobs. Even if people don't have other jobs they may prefer to go fishing or hunting rather than work in a fish plant.



If you can't find enough workers in your village, you may need to hire some people from outside the village to work in the plant. You may need to pay their travel costs to get to your village, and you will have to find places for them to live and eat while they are working in the plant. This adds to your costs and means more work for the plant manager.

People may quit in the middle of the season. If that happens, you need to be able to get new workers.



Quinahagak Fish Plant processing workers, July 2000



Quinahagak
resident John
Henry packing
fish



Checking
salmon roe

Planning Your Worker Needs

To plan for how many workers you will need, think about all the work that will need to be done in the plant before, during, and after the season. Think about the different kinds of jobs or positions for which you will need workers and the kinds of skills workers will need for each position. Based on when you will be processing fish and how much you expect to process, think about how many workers you will need for each type of position and when you will need them. Finally, use all of this information to estimate how many hours, days, or months of work you will need to pay for.



How many workers will you need?

What are the types of positions for which the plant will need workers?

What kinds of skills will each position require?

How many workers for each position will you need, both when the plant is working at full capacity and at other times?

After you have thought about how many workers you will need and the kinds of skills you will need, think about where you will find your workers. Based on what you know about the people in your village and their skills and interests, estimate how many of your workers will be from your village and how many workers you will need to bring from outside your village.



Where will you find workers?

Can you recruit workers from the village to work in the plant? How many?

How many workers will you need to bring in from outside the village? Where and how will you find them?

Where will workers who come from outside the village live? Where will they eat?

Estimating Your Labor Costs

After you have thought about how many workers you will need and where you will find them, you can begin to estimate what they will cost. Think about what wage rate you will need to pay to get good workers. You should consider what other fish plants are paying for workers, and what people are paid for other jobs in your village.

You will have other labor costs beside wages. Some of the most important are employer contributions to Social Security (including Medicaid), federal unemployment insurance contributions, and workers compensation insurance. Together these may add about 25%

over and above your direct wage costs. If you bring in workers from outside the village, you may also need to pay for their travel, housing, and food.

For getting started in your planning and your financial analysis, you may wish to use estimates of average labor cost per pound for different products, rather than estimating all the details of your labor costs. People with experience in operating fish plants can estimate what labor costs per pound are likely to be for different kinds of products in different kinds of plants.

Remember that labor costs may vary widely from plant to plant and from year to year. Labor costs depend on many factors, including what kinds of equipment you have, how efficient and skilled the workers are, what they are paid per hour, how much fish they are processing, and how much you have to pay them for “down time” when they are waiting for fish to work with or for equipment to be started up or fixed.

Over the season, and sometimes on the same day, workers may process different kinds of products. Sometimes workers do work other than processing fish, such as building or equipment maintenance. So even when your own plant starts operating, it may be difficult to figure out exactly what your processing labor costs are for each product.

This table shows one processor’s estimates of average labor costs per pound for different chum salmon products. Your own labor costs may be different.

Potential Labor Costs for Processing Chum Salmon

Product	Labor cost per pound of finished product
H & G and box (fresh)	\$0.18
Fillet-pin bone in-skin on-freeze-box	\$0.48
Fillet-pin bone out-skin on-vac-freeze-box	\$0.68
Fillet-pin bone out-skin off-vac-freeze-box	\$0.79
Fillet-smoke-pin bone in-skin on-fr.-box	\$1.24
Fillet-smoke-pin bone out-skin on-fr.-box	\$1.35
Can or jar-smoke-pin bone in-skin on	\$1.30
Ikura	\$1.00

Source: Estimates provided by the operator of an Alaska fish processing operation. Based on assumed wage of \$10-\$12/hour.



What will your labor costs be?

For each type of position:

What wage rate do you expect to pay?

What other costs, such as unemployment insurance, will you have to pay?

How many hours will you have to pay for at regular and overtime rates?

What will you need to pay for travel, housing and food for workers you bring in from outside the village?

Training

Fish processing work needs to be done carefully. Every worker needs to be trained—which costs time and money. You need to plan for how new workers will be trained and allow time for training at the beginning of the season. An important part of training is having a core group of people working at the plant who understand every part of the plant's operation and who can train new workers.

When the plant is first getting started, you may also wish to send some of your processing workers to training courses, such as those offered by the University of Alaska's Marine Advisory Program or Indian Valley Meats.

Marine Advisory Program specialists offer training in many different technical aspects of operating fish processing plants. For more information, call the Marine Advisory Program office in Anchorage at 907-274-9691, or send an e-mail message to map@sfos.uaf.edu.

Indian Valley Meats, a successful fish and game processing company near Anchorage, offers fish processor training courses for people from Alaska villages. To learn more about their training courses, call Doug Drum at 907-653-7511.



What kinds of training will plant workers need?

Where, when and by whom will workers be trained?

What will the training cost?



There's a lot to learn in operating a fish plant.

Here are some of the topics taught in the fish processor training courses offered by the University of Alaska Marine Advisory Program.

Seafood production	Quality assessment and control	HAACP
Plant design	Economic impacts of quality	Hazards
Plant set-up	QC systems: Deming's principles,	Prerequisite programs
Product flow	Total quality management, and ISO 9000	Hazard analysis
Traffic flow	Causes of quality loss	Control measures
Employee flow	Preservation methods	Verification
Information flow	Quality evaluation: sensory and chemical	Record keeping
Scheduling	Fish parasites: roundworms,	HACCP regulations
	tapeworms and protozoans	Critical control points
Fish handling	Shelf life extension methods: chemical,	Critical limits
Heading	heat treatments, enzymes, bacteria, & chemical	Monitoring
Gutting	Ozone research	Corrective Actions
Filleting	Chlorine dioxide research	GMPs
Pinbone removal	Packaging technology: MAP and CAP	Establishing an SSOP
	Packaging technology: vacuum,	FDA Hazards Guide
Secondary processing	films, labeling	Seafood Hazards
Brining		Where to go for Help
Dry salting	Better process control	HAACP plans: fresh/frozen finfish
Mincing	Botulism	HAACP plans: Cooked RTE crustaceans
Extruding	Microbiology	HAACP plans: Smoked fish
Pickling	Food container handling	Sanitation monitoring
	Principles of thermal processing	
Canning	Process room instrumentation	Food plant sanitation
Closing	Process room equipment and operation	Safety of water
Seam inspection	Still retorts: pressure processing in steam & water	Food contact surfaces
Retorting	Acidified foods	Cross contamination
	Records for product protection	Hand washing facilities
Packaging and shipping	Food plant sanitation	Adulteration
Vacuum packaging	Closures: metal & glass containers	Toxic compounds
Shipping	Retesting	Employee health
	Measuring pH	Pest control
Fish smoking	Water activity and chlorine	SSOP plans and records
History	Can seams	
Plant layout		Regulatory requirements
Equipment	Low temperature storage	FDA, EPA, DEC
Salt and salting	Terminology	Inspections
Additives	Refrigeration cycle	
Drying	Refrigeration components	Business management
Hot smoking process	Chill storage	Business plans
Cold smoking process	Partial freezing	Plant records
Product cooling	Freezing	
Smoke	Temperature measurement	Seafood marketing
Post producing handling	Ice machines	Quality considerations
Packaging	Storage in ice, CSW & RSW	Permits, licenses and reports
Shelf life	Frozen seafood storage	Bonds
Quality tests	Frozen seafood thawing	Taxes



There's a lot to learn in operating a fish plant.

Here are some of the topics taught in the fish processor training courses offered by Indian Valley Meats:

Heading	Knife sharpening
Hand filleting	Filleting machine use and maintenance
Steaking	Skinning machine use and maintenance
Salting fillets	Sizing machine use and maintenance
Freshening salted fillets	Pin bone machine use and maintenance
Brining	Tumbler use and maintenance
Pickling and wine sauces	Tumbler seasonings
Seasoning and cures	Vessel sanitation
Making salmon jerky	Water supply chlorinating and testing
Smoke producers	Ultraviolet water purifiers
Kippering (hot smoking) regulations	Sanitation (hand, foaming with air, steam cleaning, sanitizers)
Lox (cold smoking) regulations	
Strip (cold smoke) regulations and certifications	Boiler-maintenance, setup, and demonstration
Tote icing	Can teardown
Tote rotation and marking	Retort operation and record keeping
Glazing	Product receiving procedures
Sharp freezing	Calculating recovery rates
Boxing for shipping	Safeguards on equipment
Vacuum packing	First aid



Village fish processors training at Indian Valley Meats. The people in this training session were from Quinhagak, Anvik, Marshall and Ouzinkie. Doug Drum, the owner of Indian Valley Meats, is in the center of the top left picture.



CHAPTER 9. PLANT OPERATIONS


In addition to the costs of fish and workers, you will face a number of other costs in operating your plant. Among the most important factors affecting operating costs that you need to think about are processing yields, supplies, and overhead.

Processing Yields

Your processing yield-- the finished product weight as a percentage of the round pound weight of fish you buy—is a major factor affecting how much money you can make processing fish. Higher-priced products like fillets have a lower yield than lower-priced products like H&G fish. So while your product price is going up, your product weight is going down. That's one of the main reasons that the fish processing business isn't as profitable as it may seem if you just compare the prices fishermen and processors get.

Anything that lowers your processing yield costs you money. This can include machines that are out of alignment, workers not being careful, bottlenecks in processing or transportation problems—and anything that lowers fish quality.

As you plan your production, you need to estimate the processing yields you will obtain. The table below shows average Alaska salmon processing yields for selected products in a study conducted by the University of Alaska Marine Advisory Program. These yields can give you a general idea how your final product weight might compare with the round weight of fish you buy. But remember that yields can vary widely from plant to plant, and will depend on the skill of your workers, the kinds of machines you use, and the size and quality of fish you are working with.



Typical Alaska salmon processing yields reported in Chuck Crapo, Brian Paust, and Jerry Babbitt, *Recoveries and Yields from Pacific Fish and Shellfish*, University of Alaska Marine Advisory Bulletin #37 (1993).

Average Alaska Salmon Processing Yields

Product	Species			
	Sockeye	King	Coho	Chum
H&G	74%	72%	75%	74%
Fillet - bone in, skin on	53%	55%	57%	60%
Fillet - boneless, skin off	35%	36%	38%	38%
Fillet - boneless, skin on (est.)				50%
Smoke - bone in fillet, skin on	33%	34%	36%	35%
Smoke - boneless, skin on (est.)				35%
Can or jar (bone in)	67%		67%	67%
Roe*	4%	6%	7%	8%

*Roe yields may vary widely depending upon the stage of the run and where the fish are caught..

Remember to take processing yields into account when you think about the effects of changes in grounds prices. As a simple example, if your processing yield is 50%, then a \$.20/lb increase in the grounds price would cost you \$.40 per pound of finished product.



As you estimate your processing yields, remember that not all fish are good quality. Part of this fillet can't be used—which will lower the plant's yield and increase its costs.



What processing yields do you expect to average?

Where in your processing operation will yield losses occur?

Supplies

Every year your fish plant will need to buy a wide variety of supplies. The table on the next page lists some of the supplies you may need to buy and what they might cost. Remember that an important part of the cost of supplies is the freight cost for getting them to your village. Freight costs are not shown in the table.

Example of Supply Costs for a Hypothetical Village Processing Plant

<i>Type of Supply</i>	<i>Item</i>	<i>Unit price</i>	<i>Quantity</i>	<i>Total Cost</i>	
Unloading/holding supplies	Slush-ice bags	\$300	100	\$30,000	
General processing supplies	Aprons	\$10	60	\$600	
	Raingear	\$60	5	\$300	
	Hats/Hair restraints	\$15	90	\$1,350	
Cleanup supplies	Totes/tubs for sanitizers	\$56	3	\$168	
	Hoses/nozzles	\$35	3	\$105	
	Scouring pads	\$13	8	\$104	
	Brushes	\$11	6	\$66	
	Brooms	\$72	3	\$216	
	Scrubbing pads/squeegees	\$9	12	\$108	
	Detergents (5 gal pail)	\$80	10	\$800	
	Sanitizers (6 gal case)	\$28	3	\$84	
	Mop heads	\$4	12	\$48	
	Mop handles	\$11	2	\$22	
	Squeegee handles	\$9	3	\$27	
	Mop bucket	\$60	1	\$60	
	Garbage cans	\$12	4	\$48	
	Safety equipment	Hard hats	\$6	6	\$36
		Ear plugs (per box of 100)	\$21	20	\$420
First aid kit		\$50	1	\$50	
Net meat cutting gloves		\$1	72	\$43	
Fish cutting gloves		\$13	24	\$312	
Support belts		\$15	10	\$150	
Preservation supplies	Brine salts	\$11	50	\$550	
Packaging supplies	Boxes - ("mini" 50 Lb)	\$3.50	11,500	\$40,250	
	Boxes - (Export 50 Lb)	\$3	450	\$1,350	
	Box liner - 50 Lb (110/Roll)	\$58	105	\$6,090	
	Soaker pads (1000/case)	\$32	12	\$384	
	Fish sleeves (1500/pack)	\$52	40	\$2,080	
	Vacuum bags (500/case)	\$130	400	\$52,000	
	5 gal. Bucket/lid (eggs)	\$8	1,500	\$12,000	
	Strapping (9000/coil)	\$75	10	\$750	
	Box staples (2000/box)	\$12	90	\$1,080	
	Gel crystals (40 lb box)	\$165	3	\$495	
	Gel ice bags (24 oz) - 2000	\$85	7	\$595	
	Labels (per 1000)	\$100	14	\$1,400	
	Tape machine 2	\$25	3	\$75	
	Tape	\$3	72	\$216	
	Butcher twine 2	\$9	15	\$135	
	Box markers	\$0	1	\$0	
	9/16" clips (boxes)	\$14	30	\$420	
	Freezer paper - 18"	\$36	12	\$432	
	Steak paper - 10"	\$4.25	12	\$51	
TOTAL				\$155,470	

Note: The unit prices in this table were provided by vendors or were taken from supply catalogs. Although they can give you a general idea of prices, you should check with suppliers in estimating your own prices, which may change significantly over time. The quantities shown in the table are examples of potential supply needs for a small village processing plant in western Alaska. Not all supplies shown in the table would be used by all plants.



What supplies will you need to operate your fish processing plant?

Where will you buy supplies? What will the supplies cost?

How will you get supplies them to your plant? What will it cost?

Overhead Costs

Overhead costs—also called “fixed costs”—are costs that need to be paid every year that are not directly tied to how much fish you process. Here are some of the overhead costs that you need to plan for:

- **Rent payments.** If you rent any land or buildings, you will need to make rent payments.
- **Salaries.** You will need to pay salaries for your manager and any other administrative workers such as secretaries. Although some of these people may work only part of the year, the manager will need to work for several months before and after the season, finishing up with business for the season and making plans for the next season. It may be hard to keep a good manager unless you provide full-time or year-round compensation.
- **Bonuses.** In addition to salaries, you may also wish to pay bonuses, which can be an important way of retaining top employees who are crucial to your operation.
- **Building maintenance.** Every year you will need to do at least minor maintenance and sometimes major maintenance. As a rough rule of thumb, you should plan on spending at least 2% of the value of the building on maintenance each year.
- **Equipment maintenance.** Every year you will need to do maintenance on your machinery, including trucks, to fix problems caused by normal wear and tear. Sometimes you will need to do major maintenance on equipment that breaks down.
- **Insurance.** You will need insurance for your buildings and equipment. As a rough rule of thumb, this might cost 1% of the total value of your buildings and equipment. You will also need liability insurance and insurance for any commercial vehicles the plant owns. Under state regulations, you will also need a Fisheries Business Tax Bond and a Fish Processors Bond.
- **Utilities.** In addition to paying for the water and electricity used in your processing operations, you will also have other utility costs such as for telephone and internet service.
- **Professional Services.** You will probably need help each year from an accountant. You may also need to hire lawyers or consultants. These services will probably cost you at least several thousand dollars per year.
- **Travel.** Your manager and sometimes other plant employees will need to travel to places like Anchorage and Seattle to purchase equipment and supplies, make transportation arrangements, meet with consultants and sales representatives and potential customers, and attend trade shows and other meetings. You need to include costs of plane tickets and hotels for this travel in your overhead costs.

- **Loan payments.** If you take out a loan, you will need to make payments on the loan every year.

Remember, the more fish you process, the lower your overhead costs per pound. That's one of the main reasons why it's harder for a lower-volume processing plant to succeed.

?

What will your overhead costs be?

How much fish do you need to process to keep your overhead costs per pound to a level you can afford?

CHAPTER 10. REGULATIONS AND PERMITS

To operate your fish plant you will have to comply with local, state and federal regulations. These regulations require you to get permits from different agencies, pay taxes to the state and local governments and prepare various reports and plans.

Some of the regulations may seem unnecessary and arbitrary but if you do not comply with them your plant can be shut down or you may not be able to sell your fish. So creating a system for keeping your permits current, paying taxes and making up-to-date reports and plans is just as critical for your plant as getting a supply of fish, keeping your equipment working, and having markets for your products.



The regulations for fish processing plants fall into three broad categories:

- Regulations focused on food safety
- Regulations related to paying taxes
- Regulations related to fishery resource management

Food safety regulations focus on the physical aspects of your plant and how it will operate. The agencies responsible for safety want to know where the plant will get its water, the materials used in building the plant, the type of equipment and ingredients you will use, how you will process fish and store the finished product and ingredients used, and what you will do with the waste. That's why you need to start thinking about these regulations as you plan your plant.

The tax and fisheries management regulations focus more on reporting, and are less concerned with how your plant is built or how it will process fish.

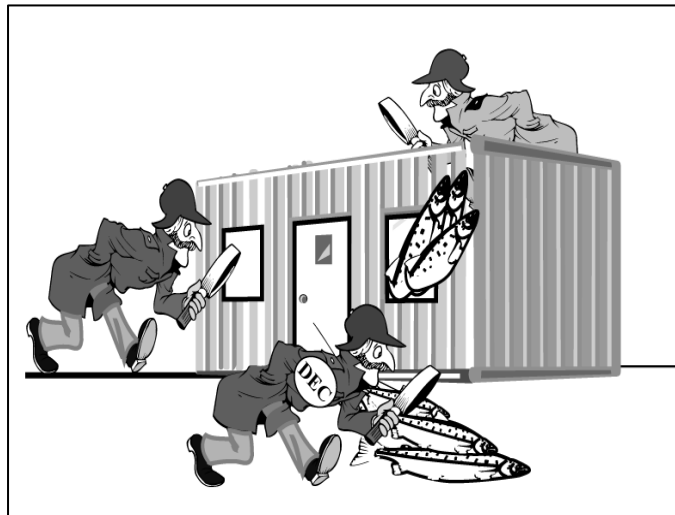
Food Safety Regulations

Fish processing is part of the food processing business, and food processing is highly regulated. There is a good reason for this. Fish that are not processed safely can make people sick or even kill them. This not only harms the person who ate the bad fish, but it also harms the plant that produced it—and the entire Alaska seafood industry.

Because of this, the agencies responsible for food safety, the Alaska Department of Environmental Conservation (DEC) for the State of Alaska and the Food and Drug Administration (FDA) for the federal government, want a lot of information, and they will inspect your plant to check on you. Their regulations are the minimum requirements for safe fish processing.

The Alaska Department of Environmental Conservation (DEC) has the most detailed regulations affecting fish processing plants. As soon as you begin planning your plant, you should start learning and thinking about what you will need to get a permit from DEC. Otherwise you run the risk that you will not be able to get a permit, or that you will have to make expensive alterations in your plant before you are allowed to operate. The DEC Seafood Processor Permit Application is available on the DEC website at www.dec.state.ak.us/eh/fss/seafood/applicationspermits.htm.

A quick look at the application instructions will show you two things. First, the application is linked to a number of other permits such as sewage, air quality, wastewater disposal, solid waste, and food service. Second, it refers often to the Seafood Processing and Inspection Regulations of the Alaska Administrative Code (18 AAC 34). A number of these regulations are the same as federal regulations. So, the good news is that if you can meet the DEC regulations you will have complied with many of the Federal regulations that apply to the operation of your plant.



Before you go very far with your planning you should call DEC and talk with fish permit staff. The DEC staff works with these regulations all the time and they can help clarify what the regulations mean, and can give you suggestions. Since DEC also has the responsibility for inspecting fish processing plants, their interpretations of the regulations are the ones that count. Running your ideas and plans by them can save you a lot of time and effort.

Before talking to DEC you should have an idea of what you want to produce and information about where you will be working and what your plant building will look like. This will help DEC's specialists focus on giving you concrete advice about your plans. At the very least, getting a seafood processing permit will require you to submit:

- A profile and floor drawing plans of your plant
- Plumbing plans for the plant that show that you meet state requirements for plumbing facilities
- Water samples
- Waste disposal plans



Will you be able to get the permits you need to operate your plant?



How will you get the permits you need to operate your plant?

How will you make sure that your plant meets all the necessary requirements?

Who will do the work to apply for the permits?

HACCP

Both DEC and the federal Food and Drug Administration (FDA) require fish processors to file a Hazard Analysis and Critical Control Point (HACCP) plan. A HACCP plan describes how you will process fish and identifies "critical control points" at which food safety may be compromised. For each of these points, the plan describes the food safety hazard, and specifies what actions you will take to minimize them. HACCP has been adopted as the international standard for food safety, and many food quality certification programs are designed along the same lines.

DEC and FDA conduct inspections of plant compliance with their HACCP plans. Understanding HACCP will help you with these inspections, and with voluntary quality assurance certification programs. The University of Alaska's Marine Advisory Program offers classes in how to draft and use HACCP plans.



"Your health department information is very very critical. If there's ever a problem with your product you need to be able to prove that you were properly licensed and inspected and have a HACCP plan and that it was properly enforced with accurate records." --An experienced Alaska village fish processor.

Selected Information from the 2008 ADEC Alaska Seafood Processors Permit Application Instructions

All fishery resources entered into commerce for human consumption must go through an Alaska Department of Environmental Conservation (ADEC) permitted seafood processing facility. If you intend to be a primary fish processor or export unprocessed fishery resources out of Alaska's jurisdiction, you must have a current ADEC Seafood Processor's Permit, and a current ADF&G code plate before you begin operating. . .

Under ***Fishery Resource*** check each resource you intend to purchase, process, or export unprocessed. . . . Identify the fishery resource utilized, the type of processing to be performed, and the package type. This will enable ADEC to determine which, if any, approvals and permits are necessary for a specific operation. In addition, the following ADEC permits may be required depending on the specific type and volume of operation.

- *Plan Review and Approval of Sewage or Sewage Treatment Works*
- *Air Quality Control Permit to Operate*
- *Wastewater Disposal Permit*
- *Solid Waste Management Permit*
- *Plan Review and Approval of Public Water Systems*
- *Environmental Protection Agency (EPA) NPDES Permit*
- *Food Service Permit*

Applications for new or recently modified operations must furnish the following plans and specifications for their facility:

- *Shore-based Facility Plans*
- *Vessel Facility Plans*
- *Plumbing Plans*
- *Water Supply and Ice Sample Results*
- *Equipment and Utensils*
- *Processing Waste Disposal*
- *Ingredients*
- *Thermal Processing*
- *Labeling*

If you discharge more than 1,000 lbs/day and more than 30,000 lbs./year of seafood processing wastes in U.S. waters, you must have an Authorization to Discharge under either an individual U.S. EPA point source discharge (NPDES) or one of the three seafood general permits.



A fish processing plant needs a lot of different permits every year. This is the Department of Environmental Conservation (DEC) permit obtained by the Yukon Delta Fish Marketing Coop in Emmonak in 1999.

STATE OF ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION Division of Environmental Health PERMIT TO OPERATE		<input checked="" type="checkbox"/> Fresh/Frozen <input type="checkbox"/> Smoking <input type="checkbox"/> Canning <input type="checkbox"/> Pickling <input type="checkbox"/> Cured <input type="checkbox"/> Shellfish <input type="checkbox"/>
This permit is granted to Yukon Delta Fish Mkt. Co-op., Inc. Yukon Delta Barge 1715 N.W. Market Street Seattle, WA 98107		
Doing business as Yukon Delta Fish Mkt. Co-op., Inc. for operation of a A large seafood processing facility, as required by AS 03.05 and 18 AAC 24, SUBJECT TO INPLANT INSPECTION		
Located in Emmonak, Alaska		
This permit is Annual and may be revoked at any time issued under provisions of Alaska Statute Title 3, Agriculture and Animals, Alaska Administrative Code, Title 18, as amended or revised, and other applicable State Laws and Regulations.		
May 5, 1999 DATE ISSUED AT 245 PERMIT NUMBER		
<i>Winnie Soares</i> Environmental Conservation Manager <i>Michael J. Ostasz</i> Seafood Permit Coordinator		
<small>This permit is not transferable and is the property of the Department of Environmental Conservation.</small> <small>DISTRIBUTION: 1. WHITE - OPERATOR; 2. GREEN - OPERATOR; 3. CANARY - OFFICE FILE; 4. PINK - FIELD OFFICE; 5. GOLDENROD - REGIONAL OFFICE</small>		



A health inspection report for a village fish processing plant. Inspectors check for many details. In observation #2, the inspector wrote: “Observed the firms processing water (from a city source). Was checked 3 times in different areas in the processing building and observed no residual chlorine.” The inspector was concerned because regulations require that processing water be chlorinated.

W.K. Bisset Address to "Compliance Officer, Seafood"

DEPARTMENT OF HEALTH AND HUMAN SERVICES PUBLIC HEALTH SERVICE FOOD AND DRUG ADMINISTRATION		DISTRICT ADDRESS AND PHONE NUMBER 22201 23 rd Dr SE Bothell, WA 98021 (425) 486-8788	
NAME OF INDIVIDUAL TO WHOM REPORT ISSUED TO: [Redacted]		PERIOD OF INSPECTION 7/04/99	C. F. NUMBER 3014493
TITLE OF INDIVIDUAL [Redacted]		TYPE ESTABLISHMENT INSPECTED Seafood Fresh/Frozen Processor	
FIRM NAME [Redacted]		NAME OF FIRM, BRANCH OR UNIT INSPECTED Same	
STREET ADDRESS [Redacted]		STREET ADDRESS OF PREMISES INSPECTED Same	
CITY AND STATE (Zip Code) [Redacted]		CITY AND STATE (Zip Code) Same	
DURING AN INSPECTION OF YOUR FIRM I () OBSERVED			
1. Observed a basket of King Salmon roe sitting on the processing room deck which had blood, viscera, and other filth in flowing water. Also, observed all roe baskets in the egg room stacked on the floor.			
2. Observed the firm's processing water (from a city source) was checked 3 times in different areas in the processing building and observed no residual chlorine. Checked in the afternoon when water usage			



Regulations can shut down your business.

Even though it was already a successful business, Dainty Island Seafoods faced a major new hurdle in the early 1990s when new health regulations banned commercial sale of traditional strips, as described in this 1993 newspaper article:

A cold-smoke processing plant that cures fish the Native way is the target of state health codes regulating the time and temperature at which fish may be preserved. Sidney Huntington, an Athabascan Indian and veteran member of the state Board of Game, said he was seeking a way around rules that bar the sale of smoked salmon known as "squaw candy" that is dried and smoked for weeks. New guidelines enforced by the Department of Environmental Conservation require fish sold commercially to be smoked in 24 hours or less.

Manny Soares, a state seafood program development manager, said traditional cold-smoking never produces temperatures hot enough to kill bacteria. He said bacteria found in cold-smoked fish include listeria, which can be lethal to the elderly and children. Huntington encountered a problem in February when the state refused to renew his processing permit. Officials called for upgrades and adherence to the processing standards. . . "I think the common sense factor is what we need to get to people like that," he said.

After improvements that he says cost thousands of dollars, Huntington was granted a limited permit in August too late to take advantage of summer sales of smoked salmon. Huntington may sell only to a cannery which does further processing that destroys any remaining bacteria, Soares said. Huntington may not sell to stores or retail customers.

Huntington's process, his own invention, injects smoke into the fish and uses an oil furnace. He says he consulted a doctor, who Huntington claimed has opposed cold-smoke processing, and asked for an inspection. No bacteria was found, Huntington said. "We wanted it done to prove the Native fish was safe food to eat," he said.

Soares said the new guidelines affect few smoke-dried processors since most have switched to techniques that meet the standards and produce a similar product. Regulations do not cover cold-smoke processed fish that is for home consumption.

"There are bootleggers out there," said Patsy Perkins, a state environmental health officer in Fairbanks. Smokehouses caught selling their wares at stores or fairs will be advised they must have permits, Perkins said.

(From an Associated Press article reprinted in the *Anchorage Daily News*, 1993).

Taxes and Fisheries Management

The Alaska Department of Revenue and Alaska Department of Fish and Game are the State agencies responsible for collecting fisheries taxes and managing fish resources. They have combined their applications for permits and licenses in the *Alaska Fisheries Business License Application and Intent to Operate*. You can get this permit at these agencies' websites. These permits require that you report the results of your operation at the end of the year. You need to make sure that you have a system in place to collect the information you will need to make these reports.

Fish Taxes

The Alaska State Department of Revenue is responsible for collecting fish taxes for the state. Processors are responsible for paying the Fisheries Business Tax, and are responsible for collecting landing taxes and salmon enhancement taxes from the fishermen who deliver to them. Not only must processors pay these taxes but the Department of Revenue also requires that they provide guarantees that they will pay. You will also have to provide a surety or guarantee that you will pay fishermen and your employees. In the Fisheries Business License Application and Intent to Operate, you provide the Department of Revenue with the information about your guarantee. You can find more information about fish taxes at the Department of Revenue website: www.tax.state.ak.us/programs/fisheries/faq.asp.

Depending on where your plant is located you may also have to pay local taxes. You should contact both the borough and village governments to find out about local taxes and how they are collected.

Fisheries Management

Anyone who has fished commercially in Alaska knows that processors have to provide fishermen and the Alaska Department of Fish and Game with fish tickets. You need to submit the *Alaska Fisheries Business License Application and Intent to Operate* in order to receive fish ticket books from the Department of Fish and Game, and also the code plates for the fish ticket imprinting machine.

If your plant will be processing fish caught under individual fishing quota or community development quota programs you will need to comply with National Marine Fisheries Service (NMFS) regulations for these programs.

Other Regulations

There are a number of other licenses and permits that all businesses including fish processing plants must have to operate. You will need to have an Alaska Business License, have a social security number or taxpayer id number, arrange for federal withholding of your employee taxes, get worker compensation insurance, and comply with the Alaska Department of Labor and Workforce Development (DLWD) regulations for employees. DLWD has a helpful handbook for employers available at its website. All of the scales you use in your plant must be registered with the Division of Measurements and Standards.

A Partial List of Permits You Will Need to Operate A Fish Processing Plant

	Type of Permit or License	Agency
State permits	<u>Seafood Processor Permit Application</u>	AK Department of Environmental Conservation
	Hazard Analysis and Critical Control Point plan	DEC
	Alaska Fisheries Business License and Intent to Operate	AK Department of Revenue AK Fish and Game
	Scale inspection	Division of Measurements and Standards
	Business License	Department of Community and Economic Development
	Hazard Analysis and Critical Control Point plan	Food and Drug Administration
	Food Facilities Registration	Food and Drug Administration
	Nutrition Labeling	FDA for retail packaging
	Registered Buyers Permit	NMFS for IFQs (Halibut and Sablefish)
Federal permits	Taxes	Borough, city governments
	Land use permit	Borough, city governments
	Utilities use (electricity, water, sewer, landfill)	Borough, city governments
Local permits	Taxes	Borough, city governments
	Land use permit	Borough, city governments
	Utilities use (electricity, water, sewer, landfill)	Borough, city governments

Certification Programs

More and more consumers in the United States and other countries are looking for guarantees that the food they are buying is wholesome and is sustainably harvested. A number of independent, voluntary certification programs have sprung up to offer fish buyers and consumers additional guarantees of quality, traceability and sustainability. These types of certification programs are becoming increasingly important to small processing plants focused on high value markets. Meeting their regulations, inspection standards and reporting requirements will be easier if you have a good system for complying with government regulations.

State and federal regulations are the minimum requirements for fish processors. However, your customers may require that you meet additional requirements—or you may want to meet them in order to gain a marketing advantage. These include quality certification programs like the ISO 9000 and the Alaska Quality Seafood (AQS) program, environmental programs like the Marine Stewardship Council and ISO 1400 certification programs, and traceability standards. In the future, it is likely that these standards will spread throughout the industry.

Quality certification programs are concerned with “quality management”: ensuring that your products conform to the customer's requirements. These programs normally use a process based approach similar to HACCP plans. To become certified you need to develop a plan, and then have a private auditor, like the AQS, review and certify your plant.

Several large retailers in the U.S. and the European Union have initiated programs that will require producers to be able to trace their products from its point of origin to the consumer. New radio frequency identifiers (RFID) are already used by some larger seafood producers to track their products and provide inventory control. New RFIDs can track both the fish and log its temperature from harvest to final sale. Given the importance of temperature in quality control and safety, this technology is a natural fit with HACCP and quality management plans.

The seafood industry has seen a rapid growth in voluntary quality, environmental and traceability programs. Participating in these programs could give your processing plant a competitive edge now, while giving you experience developing and working with system that will increasingly become required rather than simply voluntary.

Selected Sources of Information about Fish Processing Regulations, Permits and Certification

Alaska Department of Environmental Conservation

Division of Environmental Health, Seafood
Section

555 Cordova St.

Anchorage, AK 99501-2617

Tel: (907) 269-7640

Fax: (907) 269-7510

www.state.ak.us/dec/

Seafood Processors Permit Information (907)
269-7501

Alaska Department of Fish and Game

Division of Commercial Fisheries

P.O. Box 25526

Juneau, AK 99802-5526

Tel: (907) 456-3210

Fax: (907) 456-2604

www.cf.adfg.state.ak.us

Intent to Operate Information (907) 456-6131

Division of Measurements and Standards

Section of Weight and Measures

12050 Industry Way , Building O

Anchorage, AK 99515

www.dot.state.ak.us

Alaska Department of Revenue

Tax Division

P.O. Box 110420

Juneau, AK 99811-0420

Fisheries Business License Information (907)
465-2371

Fax: (907) 465- 2375

www.revenue.state.ak.us

Alaska Department of Community and Economic Development

Business Licensing

PO Box 110806

Juneau, AK 99811-0806

(Office Hours Mon-Fri - 8am to 5pm)

Business License Staff: (907) 465-2550

Business License Fax: (907) 465-2974

businesslicense@alaska.gov

Business Licenses application on line at:

http://www.commerce.state.ak.us/occ/apps/BLEC_Start.cfm

Alaska Department of Labor and Workforce Development

Employers Handbook available at:

<http://jobs.alaska.gov/handbook/AERM.pdf>

Food and Drug Administration

Food Processor Registration application
available at:

<http://www.cfsan.fda.gov/seafood1.html>

National Marine Fisheries Service, Sustainable Fisheries

PO Box 21668

Juneau, AK 99802-1668

PH: 1-800-304-4846 - option #3, or (907) 586-
7228

www.fakr.noaa.gov

Marine Advisory Program

HACCP

<http://seagrant.uaf.edu/map/haccp/index.html>

Alaska Quality Seafood

700 West 41st Ave

Suite 205

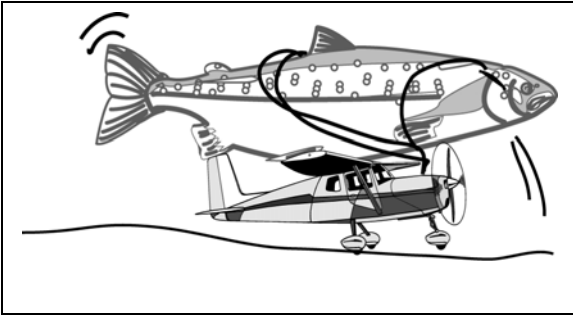
Anchorage, Alaska 99503

Phone: 907-565-5655

Fax: 907-565-5646

<http://www.alaskaqualityseafood.com/>

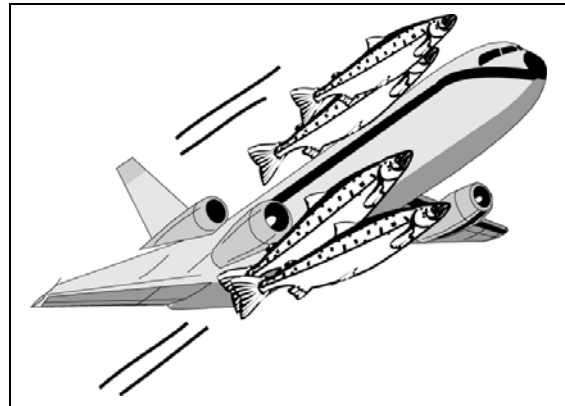
CHAPTER 11. TRANSPORTATION



Transportation is one of the biggest challenges facing village fish processing plants. It costs more—sometimes much more—to ship fish products to U.S. or foreign markets from most western and interior Alaska villages than it does from processing plants on the coast of southeast or southcentral Alaska. It also costs more to bring in supplies.

Most village processing plants have only two transportation options. Fresh products have to be shipped by air. Frozen products can be shipped by water or air.

It's important to think realistically about what your transportation costs will be and what you can do to keep them as low as possible. Higher transportation costs can make it difficult for village fish plants to compete with plants in other parts of Alaska—especially if they have access to jet service.



If you are shipping fresh products by air, your transportation costs will depend on what length runway your village has, what kind of planes can land on it, and what kind of scheduled flight service is available. If only small planes can land at your village, your costs will also depend on how far planes need to fly to get to a larger airport with jet service. If you have to fly product a long way in small planes, it may be more difficult to operate a fish plant successfully in your village.

If you are flying fresh fish, it also matters how quickly you can get them to market, and how they are handled along the way. Fresh fish products have a limited shelf life and they can spoil quickly and lose all their value if they are not kept chilled. It is essential—but not easy—to make sure that your fish can get to market in good condition.

You also need to think about whether you can get reliable transportation so you can get your products to your customers when they are expecting them. If bad weather, mechanical problems with planes, or not having enough planes make it impossible for you to ship your fresh fish, you need to have a backup plan for what you will do instead. Having a reliable way to refrigerate your product locally is a big plus.



Can you ship your products to market at a reasonable cost?

If you are selling fresh fish, can you get reliable transportation to get your products to market quickly and in good condition?

Transportation to your Plant

Your first transportation challenge in operating a village fish processing plant is getting people, supplies, equipment, and replacement parts to your plant. Normally you will try to ship as much as you can by barge—particularly bulk goods—or by bypass mail. You have to do a lot of careful planning before the season to make sure you have everything you need when you need it.

You have to plan for what can go wrong. Will the barge bring the bulk goods when you expect them? Will the mails and air freight arrive when you expect them? If the wrong part arrives, what will it cost to send it back and how long will you have to wait? Your entire operation can be put on hold if you don't have people, supplies and working equipment when you need them. Part of planning for what can go wrong is having backup equipment and parts on hand for when something breaks.

Choices in Shipping Fresh Fish

In many ways it's easier for a village fish processing plant to produce fresh products rather than frozen products, because you don't need to have freezing equipment and a way of storing your frozen product. However, shipping fresh fish to market can be complicated, costly, and risky.

One challenge is figuring out the most cost-effective way to ship your fish. You have to think about several related questions at the same time:

? ***What options are available at what costs? What types of aircraft can land at your village? How often are there scheduled flights? How much fish could they fly out for you? How reliably would they have room for your fish? What types of charter service is available? What would it cost?***

Scheduled air service is generally cheaper, but it may not be frequent or reliable enough to meet your needs.

? ***How much fish are you shipping?***

Shipping fish on larger planes in larger volumes is generally cheaper—but only if the planes are flying full.

? *What kind of containers are you shipping your fish in?*

Shipping fish in larger containers—such as 1000 lb totes rather than 100 lb wetlock boxes—saves on labor costs and packaging costs. But you need a larger plane to ship in larger containers, and you have to have enough fish for the plane to fly full.



Who is going to fly it? How much can they lift? What's the cost per pound? Are you limited to a 206? Because that definitely jacks the cost up. If you can get a DC3 or a DC6 in there that changes the equation substantially. But then you've got to be able to handle that many fish, store that many fish, chill that many fish.

—An experienced Alaska fish processor

You can fly fish out of just about anywhere at some price, but whether you can do it and make money is very dependent on your transportation.—An experienced Alaska fish processor



Boxes of fresh halibut ready to be trucked from the Mekoryuk Fish Plant to the Mekoryuk airstrip. Every step in handling fish—like this one—costs money.





Two options for flying fresh fish from Quinhagak. These pictures show two of the planes used to fly fresh fish from Quinhagak to Bethel during the 2000 salmon season. The plane in the top picture is a Twin Otter and the plane in the bottom picture is a Caravan. The Twin Otter was a scheduled mail passenger plane which flew every day. Regularly scheduled flights charge a fixed price per pound and are usually the least expensive. But the plant couldn't predict how much the plane would be able to carry, because mail and passengers had priority. The Caravan was chartered by the plant and could carry a bigger load. But unless the plane flew with its full payload of 3300 lbs transportation costs per pound could get very high.





Two options for flying fresh fish from villages. Arctic Transportation Services (ATS) , a major freight shipper in western Alaska operates CASAs and Cessna 207s. (From ATS website: www.atsak.com.)

The CASA is a twin, turbine-powered aircraft with a payload of up to 5,500 pounds.



The Cessna 207, the mainstay of rural Alaska air transportation, can handle 1,000-1,200 lbs on a good day, but only in 100 lb wetlock boxes. Like most smaller aircraft it has to be loaded from the side.



Loading 100-lb wetlock boxes of fresh H&G salmon into a Cessna 207.





Totes vs. Wetlock Boxes

1,000 lb totes are good for flying fresh fish, as they're fairly inexpensive to buy and it takes less labor to pack them. But to use them you need a CASA or similar plane which can easily take up to five of them on a trip. For smaller aircraft, such as a Cessna 207, you'll have to ship your fish in smaller containers, such as 100 lb wetlock boxes.



Challenges in Flying Fish from Quinhagak in 2000

Getting fresh fish from Quinhagak to Bethel and then on to Anchorage was one of the biggest challenges for the Quinhagak fish plant during the 2000 season. The biggest load that could be flown out of Quinhagak was a little more than 5,000 pounds. That meant that flying the fish from a 50,000-pound fishery opening sometimes took more than 12 flights per day—so that the plant needed every aircraft available to get the fish out.

Another challenge was the lack of a cool storage space in Bethel. Sometimes fish stored in Bethel during the day while waiting for evening flights to Anchorage were too warm for fresh sales by the time they reached Anchorage. To address that challenge, in 2001 Coastal Villages Seafoods placed a refrigerated van at the Bethel airport to hold product.

When you're calculating the cost of shipping fish by air, don't forget that rate quotes are based not on the weight of your fish but rather the "gross weight"—the total weight of the boxes, fish and anything else in the box such as gel ice. A box with 50 pounds of fish might have a gross weight of 57 pounds when the additional weight of the "tare"—the weight you're shipping in addition to the fish—is included.

Also be sure to ask if fuel surcharges and taxes are included in rate quotes.

Making Sure Your Fish Arrive in Good Condition

Another major challenge in shipping fresh fish from a village processing plant is ensuring that it is kept chilled and arrives on time. Any mishandling or delays between when the fish leaves your plant and is delivered to your customer can cause loss of quality, damage to your relationship with your customer, and at worst total loss of your fish. To earn and maintain a reputation for producing high quality fish, it isn't enough to make sure that the fishermen deliver high quality fish to the plant and the plant produces high quality products. You have to work just as hard to make sure that the quality isn't lost in shipping the fish to market.



*When you're doing fresh it's a lot of value and it can go bad quickly.
—An experienced Alaska fish processor*

A lot can go wrong—and frequently does go wrong—in flying fresh fish to market from rural Alaska:

The plane may not arrive to fly your product when you expect or need it. Bad weather, smoke from forest fires, and mechanical problems are just some of the reasons planes may not be available. You need a backup plan for how you will keep your fish chilled until transportation is available—or an alternative such as freezing.

If the fish are transferred along the way from one plane to another plane, the connecting flight may not arrive. You need to have a plan for how to ensure that the fish are kept chilled while they wait for another plane.

When they arrive at their final air destination, the fish may not be put into refrigeration or picked up by the customer when they are supposed to. You need to have a plan to ensure that the fish are kept in good condition until the customer takes possession and they are no longer your responsibility.

It's a wise investment to pay extra to have people in each place where something could go wrong, to make sure that the fish are handled well everywhere. Even so, expect to spend a lot of time on the phone, following-up. You can also arrange for air carrier insurance, but it's expensive, and it's important to know exactly what you are insuring for and what the limitations of the policy are.

Developing a strong relationship with your local air carriers and your buyer should be an important part of your strategy for ensuring that your fish are handled well. If they know you and value their relationship with you, they may work harder to make sure that your fish arrive in good condition.

The challenges involved in transporting fish is one of the reasons that many processors sell to distributors, rather than to end users such as retail stores or restaurants. Distributors specialize in dealing with these challenges. But you will generally need to get your fish at least to Anchorage before a distributor will assume ownership.



*Your distributor will take care of those problems for you—if you have a distributor. That's the middleman people always talk about getting rid of. He's got an office that has personal relationships with all the cargo handlers in all the airports in the United States.
—An experienced Alaska fish processor*



How will you make sure that your fish are handled carefully, kept chilled, and delivered on time?



You need to think about that product getting sidelined somewhere along the track. It could get sidelined in Anchorage, if you're lucky. Or it could also get sidelined in Denver in the middle of summer, where it's a hundred degrees on the tarmac. And they just put your boxes off to the side. They're going to get on the next plane. But then there's a shift change, and one guy forgot to tell the other guy about these boxes out there on the tarmac and they cook.

*You can't avoid it. It will happen. It won't happen regularly, but it will happen often enough. And when it happens it's devastating. Because you have bought those fish and paid for all this stuff, and it's a 100% loss.—
An experienced Alaska fish processor*

We've had fish going to a Lower-48 market all the way from an Alaska village. We had beautiful fillets into Bethel, into Anchorage, Fed-Exed all the way out, on the DHL truck. And the truck gets all the way to the doors of the distribution center; and it's on the wrong pallet. And we get a call.

Sometimes it can be all the way there. We've had where the driver doesn't have the right license going into the distribution center. And we'll get a call—it will be somewhere in remote Alaska and you have to deal with that and you've got a melting ice cube and you have such a small window to get unloaded.

For everything you need a backup or a go-to person that can spring into action.—An experienced Alaska processor and distributor

Shipping Frozen Fish

If you have large enough production you can freeze fish and store and ship them to market in 40' van loads (approximately 40,000 lbs). It is critical to make sure that the refrigeration units are functioning properly. You can lose all your production if they fail. You may also wish to buy shipping insurance.

Expediting

If you operate a fish processing business in a village, you will frequently need to do business with people in the city, usually in Anchorage or Seattle. You may need to purchase parts for equipment that has broken down, or supplies such as boxes, bags or bolts. You may need to deal with shipping problems in getting your products on the right plane to the right place. You may need to arrange for permits or paperwork.

It can be difficult, frustrating, and expensive to do this kind of business at a distance over the phone. In planning your plant, you should think about working with an expeditor—someone in the city who can help you with big or little problems when you need help. It will probably be too expensive for you to hire a full-time employee, unless that person can combine helping you with doing another job, perhaps working for other organizations based in your village or your area. You may instead want to contract with someone to help you out on an as-needed basis.



You can't start a fish plant without expediting support. To run a fish business you have to have backup managerial help and backup parts, you have to have these things or you can lose your ass in one weekend. I could call them at 10:00 Friday night and tell them I need a carburetor by 10:00 tomorrow morning or we can't get our fish to the airport.

—A former Yukon River fish processing plant manager, talking about expediting assistance provided by the Community Economic Development Corporation



How will you arrange for expediting help outside your village?

CHAPTER 12. PLANT MANAGER

A critical part of any business is having a good manager. For your fish plant to succeed, you need to have a good manager running it.



The manager has to think about everything that needs to be done to make the plant a success—and make sure that it gets done. Sometimes he may have to do it himself.

Your manager needs to be good with people: hiring people who can do the work, teaching them how to do it, and getting them to do the work well. Your manager needs to be good with equipment— from boat engines to ice-making machines to vacuum sealers. He or she needs to know how to use equipment, how to maintain it, and how to fix it when it breaks, or how to find someone who can fix it. Your manager needs to be good at keeping track of how much money is being spent and

how much money is coming in, and not spending too much money. Your manager has to know what supplies are needed and order them in time.

During the season, being a fish plant manager is a full-time job—seven days a week, twenty-four hours a day. The manager has to be ready to deal with problems at any time—equipment breakdowns, power failures, injured workers.

For your plant to succeed, the manager will have to make tough decisions. If markets aren't good, the manager may have to decide to pay fishermen lower prices than they want. The manager may have to decide not to buy fish from fishermen who aren't handling their fish carefully enough. The manager may have to fire workers who aren't doing their jobs.

Getting a good manager is particularly important the first season, since you will be doing everything for the first time and that's when the most problems are likely to occur.



Usually it takes experience in the fish business to manage a successful fish processing plant. If there isn't someone in your village who can manage your fish plant, you will need to find someone who can come to the village to manage the plant during the season.

The manager can't always be there to deal with every problem. You need a trained back-up person at the plant who can handle the manager's responsibilities when necessary.



Sydney Huntington



One of the major factors in the success of Dainty Island Seafoods was that the owner and operator—Sydney Huntington-- was talented, energetic, resourceful, highly respected both locally and statewide, and willing to work long hours to face up to regulatory challenges and to meet the demands of his growing market. This picture was taken in 1993.



A manager has to know about more than just processing fish.

Wetlocks sitting in the sun can spontaneously combust--the heat builds up --and they torched off. I said "grab the fire extinguisher!" and they all looked at me and said "what are they?" They were stacked right next to the plant. No one had had fire drills and there wasn't anything in the fire extinguishers anyway. They hadn't been recharged.
—A manager of a Yukon River fish plant recalling an incident shortly after his arrival:



All these operations are people dependent. It's one or two people that can bring them up, and one or two people can bring them to disaster if they walk off.—A former village fish plant operator



Fish Plant Manager Job Description

The 1996 Unalakleet Fish Processing Plant proposal included this job description for the plant manager:

Obtains all necessary federal and state permits for processing seafood for either the fresh or frozen markets

Prepares plans and budgets as it relates to the purchasing and the processing of herring, salmon and crab in the Norton Sound area.

Prepares Quality Control Guidelines for the processing of herring, salmon and crab for the Plant Foreman and seafood processors.

Prepares equipment maintenance schedules for plant foreman to insure that all equipment will operate properly during the entire fishing season.

Directs preparation and distribution of all employee and fisherman payroll and benefits.

Works closely with Marketing manager to insure top dollar is received on the sales of herring, salmon and crab.

Prepare all Federal and State reports that are required at the end of each fishing season. Prepares Annual Operations profit/loss reports for the NEDC Board, and recommended changes for the next year's operations.

Is responsible for the entire operations of the Unalakleet Fish Processing Plant.

?

Who will manage the plant during its first season?

Does this person have the necessary experience and training for starting up a fish plant?

If you don't have someone in mind yet to manage the plant, how will you find a manager?

CHAPTER 13. OWNERSHIP AND FINANCING

Three critical questions for any business are (1) who owns the business, (2) who has control over the business, and (3) where the money comes from to start the business. The answers affect how much money there is to build and equip the plant, who makes the management decisions, how hard it is to get loans for the plant, who is responsible for debts, and who gets to share in the profits.

Business Ownership and Structure

Usually the owners of a fish processing plant, who have the final say in business decisions about the plant, are the people or organizations that put up the money to start the business. There may be several options for the business structure of a fish plant. Some of these are sole private ownership, partnerships, private or public corporations, and cooperatives. You should think carefully and seek advice about what business structure will work best for your plant. The answer will depend on who the owners are, how many owners there are, and what their objectives are.

Many types of businesses have a board of directors. The board of directors can play an important role in the success of your fish plant. Even though the board of directors doesn't usually get involved in day-to-day operations, the directors make the most important decisions, such as hiring the manager and other key people and approving major decisions. A good board of directors takes an active interest in the plant and learns enough about the fish processing business to make good decisions. Try to get the best people you can for your board of directors.



Experience has shown that fish plants run by independent operators do better than those run by committees. People are a lot more careful about what they're doing when it's their own credit card on the line.
—An experienced western Alaska fish processor.



Who will own the plant?

What type of business structure will the plant have?

How will the board of directors be chosen?

What kind of expertise will the board of directors have in operating a fish plant?

Financing

You will need financing to build your plant, buy equipment, and meet your cash flow needs. Grants from public agencies can help—but they won't be enough. Even if you got a grant to build an entire plant and to buy all the equipment you need—which is highly unlikely!—you will still need money to pay for your operating costs. Processors with a record of successfully operating a fish plant can get “pack loans” to finance their operating costs—but banks are unlikely to loan money to a new company. Someone—an organization or private investors—will need to be willing to invest money in the operation to get it started.



Nobody ever gave anyone a grant for a pack loan.
—An experienced Alaska fish processor.

If you have a source of collateral—such as your home or another business—you may be able to get a loan. But the more money you borrow, the more you will need to pay back each season, and the more you may need to give the lender a say in how you run your plant.



How will you get the money to build your plant, to buy equipment, and to begin operations?

Who is willing to invest money in the plant?

How much money are they willing to invest?

What grants can you get?

How do you apply for the grant?

What conditions must the plant meet in order to get the grants?

What loans can you get?

Who will loan the money?

What is the interest rate?

What is the payment schedule?

What is the collateral?

A Different Option: Leasing Your Fish Plant

What if you want to have a fish plant in your village to provide markets for fishermen and jobs in the community, but you don't have the expertise to run a fish plant, or don't want to take on the responsibility or the risks? One option is to build a fish plant, but lease it to another company to operate.

If you lease your plant, you will have less responsibility and less financial risk. If you lease your plant to a company with experience in processing and marketing fish, it may be able to operate more successfully than if you tried to operate it yourself. However, you will have less control over decisions, such as who gets hired and what fishermen get paid, and you won't receive as much of any profits. Make sure you work with a reliable company and have good communications to ensure that your plant is used well.

Operate your plant yourself or lease it out?	
Operate it yourself	Lease it out
More control More money if the plant is profitable	Less responsibility Less financial risk Easier for the operators to take unpopular decisions which may be needed for the success of the operation
<i>but</i>	<i>but</i>
More responsibility More financial risk Harder to take unpopular decisions	Less control Less money if the plant is profitable



Different management choices

During the 1980s, small halibut processing plants were built in Toksook Bay, Tununak, and Mekoryuk to provide opportunities for local fishermen to harvest halibut and have a place to sell their catch. Each was managed in a different way. The City of Toksook Bay leased its plant to an individual who operated it for his own profit. The Tununak Elders Traditional Council operated their plant themselves as their only business operation. The Mekoryuk plant was operated by Bering Sea Reindeer Products, Inc., which was a subsidiary of the Native Village of Mekoryuk. Now all three plants are operated by Coastal Villages Seafoods, Inc., a subsidiary of the Coastal Villages Region Fund CDQ group.

CHAPTER 14. EXAMPLES OF VILLAGE PROCESSING PLANTS

This chapter briefly describes eight village processing plants that were built in seven western Alaska villages in the 1980s and 1990s. The villages are shown on the map below.

The experiences of these plants help to illustrate some of the significant challenges faced by village fish processing plants. As of 2008, when this handbook was updated, several of the plants had gone out of business. Several others had been taken over by CDQ groups, which had greater financial resources and other capacities to operate the plants than their original owners.

The descriptions of the plants are short and don't tell the "whole story." Different people who were involved with each plant might have different perspectives about what happened and why it happened and what went well or didn't go well.

Although the plants faced significant challenges, several of them showed that it was possible to overcome these challenges and operate and provide economic benefits to their villages.



Dainty Island Seafoods

For many years Sydney Huntington operated a small fish processing plant on Dainty Island, about 38 miles up the Yukon River from Galena. The Dainty Island Seafoods operation evolved over several decades. It began as a family fish camp in the 1960s. Later Sydney Huntington began to sell traditional-style smoked salmon strips, first locally and then in stores in Kotzebue, Barrow and other Northwest Alaska communities and to friends throughout Alaska. The demand for this product grew over this time and was more than he could satisfy, partly because the product was reliably good and was consistently available.

In the 1980s Sydney Huntington ran into problems meeting Alaska Department of Environmental Conservation (DEC) regulations. He went through major remodeling and retrofitting so that his plant could meet these standards, which took several years and technical help from many sources. The operation received several small grants to assist in these upgrades. Afterwards the plant continued to produce smoked salmon strips and other value-added products. Sydney Huntington retired from the business in the late 1990s and it now operates intermittently on a smaller scale.

The plant was located in a plywood building about 30' by 40' with a butchering room, cooking room, brining area, and smoke room. Equipment included an oil furnace used to maintain steady heat for smoking and a generator for power. The operation used chums, cohos and kings, most of which were caught by Sydney Huntington himself, although he also bought some fish from local fishermen. The operation involved heading, gutting, filleting, smoking and freezing the smoked product. At its peak, the plant produced about 10,000 pounds of fish and employed two or three local residents.



Sydney Huntington's fish camp on Dainty Island. The tall building is the smoke room part of the fish processing plant.

Maserculiq Fish Processors, Inc., Marshall

Maserculiq Fish Processors, Inc. is located in Marshall on the lower Yukon River. The plant was one of several constructed with financing from the Community Enterprise Development Corporation (CEDC) during the late 1970s. It began operating in 1977 and processed about a million pounds of fish in 1978 and 1979, of summer and fall chums, and kings.

The operation began in a 60' x 30' metal building. After the successful 1978 season, the two-story Quonset style building shown in the picture was added. The plant operated several 27' tender boats. In some years product was shipped in a flatbed truck to the Marshall airport and flown in small planes to Bethel; in other years it was shipped by river to St. Mary's. The operation provided as many as 50 ~ 60 jobs.

For a period of time in the 1980s the plant facilities were leased to a Seattle-based company, which continued to buy fish from local fishermen. The company was not able to hire enough workers locally so it brought in workers from outside the village.

In the mid-1990s the plant stopped processing fish and operated only as a buying station, providing ice and then tendering fish to St. Mary's. It operated in 2000, using new smoking equipment purchased with a grant. However, it only produced a small volume due to very low Yukon River salmon returns.

The company's new smoked products are marketed under the name Yukon King Seafoods. Their product *Yukon King Seafoods Traditional Salmon Strips* won the Grand Prize in the 2001 Alaska Symphony of Seafood competition. The judges praised the product for its color and smooth taste and noted that the company was able to produce a traditional "Indian candy-style" product using an FDA-approved smoking process.

The plant ceased operations for a couple years due to low fish runs, but resumed limited H&G production in 2003, and has hopes for resuming smoking with some new equipment (as of 2008). Currently the general manager for the operation, also in charge of sales, is an Anchorage resident, but the majority of employees are local residents.



Maserculiq Fish Processors, Inc. in Marshall

Quinhagak Fish Plant

The Quinhagak salmon plant was built in 1992 with federal and state grants and is owned by the Native Village of Kwinhagak IRA Council. The plan was to process fresh salmon from the Quinhagak and Goodnews Bay fishing districts at the mouth of the Kuskokwim River, and fly it to Bethel. Traditionally, local fishermen had sold to tenders operating out of Bethel. However, except for the ice machine, the plant did not operate for a number of years. Groups that considered operating the plant decided that it wouldn't be profitable because of several factors including the cost of flying fish out of the community, not enough local workers, and competition from other processing facilities, including their own operations.

In 1999, a subsidiary of Coastal Villages Region Fund CDQ group began to operate the plant but produced only 8000 lbs and lost money because of poor silver salmon runs. However in 2000 the plant did much better, increasing production to more than 400,000 pounds, producing high-quality headed and gutted and filleted fish, and paying relatively high prices to local fishermen. Fish were flown in wetlock boxes to Bethel and then on to Anchorage and the Lower 48. Coastal Villages Seafoods, LLC expanded production substantially in 2001, purchasing well over 1 million pounds, producing salmon caviar, and both fresh and frozen products. They made major new investments, adding new equipment, a bunkhouse and mess hall complex, thanks to a USDA grant. By doing more of the processing in Quinhagak, they hope to reduce shipping costs and also create more local income. Workers are flown in from many CVRF villages, around the Y-K Delta.

The original plant was in a 30' x 60' modular building, with an attached ice room and cold storage room and a separate 30' x 40' refrigeration building. The current upgrades will double that size. During the 2000 season the plant employed about 50 ~ 60 people. By the following season, it was well over 100. In following years, new freezing capacity was added, and the ability to ship out 40' van loads of frozen product.

A talented and dedicated manager from the village had played an important role in successfully starting up the plant. The plant also benefits from the high quality of fish caught in ocean bright condition near the plant and consistent fishery openings over the season. Some of the challenges faced by the plant include the cost and logistics of flying fish in small planes and finding enough workers.



Refrigeration building at the Quinhagak fish plant, Summer 2000.



Unloading king salmon at the Quinhagak fish plant dock, July 2000.



Cutting line in the Quinhagak fish plant, July 2000.

Mekoryuk Fish Plant

A small halibut processing plant was built in Mekoryuk on Nunivak Island in the early 1980s to provide opportunities for local fishermen to harvest halibut and have a place to sell their catch. The processed halibut are flown to Bethel for air transport to the fresh market.

At first, the Mekoryuk plant was operated by Bering Sea Reindeer Products, Inc., a subsidiary of the Native Village of Mekoryuk, which also operated a reindeer processing plant at Mekoryuk. The plants benefited from the exceptional management skills of Mekoryuk resident Ted Moses. Tragically, Mr. Moses was killed in June 3, 1996, when the helicopter he was piloting crashed near the village.

After 1995, prices for the plant's halibut fell when the IFQ program expanded the supply of fresh halibut from other parts of Alaska, and the plant lost money. Since 1999, the plant has been operated by Coastal Villages Seafood, LLC, a subsidiary of the Coastal Villages Region Fund CDQ group. There are five additional village halibut plants operated by CVS, from Kipnuk north to Hooper Bay, and they were able to catch the entire local quota of over three hundred thousand pounds in 2007. The grounds price for halibut has increased considerably, which has helped the effort.

This picture shows the Mekoryuk halibut processing plant in 1994. The trailer on the right, with doors wide open on both sides, is the actual halibut processing facility. The trailer in the middle is the shaved-ice-making unit. The large building on the left is the Mekoryuk subsistence freezer.



Tanana Fish Plant

During the early 1980s a fish processing plant was constructed with private funding in the village of Tanana. The total cost of the building and equipment was more than one million dollars. The plant operated only briefly and the building and equipment was eventually abandoned. At one point it was bought as a tax write-off by several Oregon ranchers. Two very basic problems faced by the Tanana plant were the lack of adequate local fish supply and lack of a realistic business plan. At first the would-be operators didn't even know the location and timing of the fish runs. They tried to buy fish lower down the river and fly them to the plant, in airplanes unsuited economically for the job — an extremely expensive and impractical way to get fish.

The Tanana fish plant is a worst-case example of what can go wrong with a fish plant. It illustrates a simple but very important principle: a successful fish plant requires much more than a building and equipment, starting with a business plan and good management.



The abandoned
Tanana Fish Plant



Abandoned
cardboard fish boxes

Yukon Delta Fish Marketing Co-op, Emmonak

The Yukon Delta Fish Marketing Co-op was a fisherman's co-op established in the late 1960s in Emmonak. The co-op had about 260 members, and a 9-member Board of Directors. After beginning with a small shore-based plant, the coop operated a large salmon freezing facility on a barge, as well as several tender boats, and had a supply and office building on shore. Funding for the co-op's facilities and equipment had been provided by a number of grants, including a major refurbishing of the barge in the mid-1990s.

The plant produced frozen headed and gutted king salmon which were sold to Japanese buyers, as well as fresh and frozen H&G chum salmon. During the 1990s at the height of the run the plant employed as many as 100 people working on the barge, tender vessels, and onshore supply operations.

The co-op survived for many years in the difficult Alaska fish business, and provided a market for its members and jobs for local residents. However, it also faced a variety of challenges. The most serious problem was the disastrous decline in Yukon River salmon runs, which affected not only fish supply but also made it difficult for fishermen to repay loans made by the co-op, and for the co-op in turn to repay its own loans. Other challenges included competition for fish from other Lower Yukon River buyers and difficulties with the management of the co-op. Although the original plan was that the co-op would pay dividends to members from its profits, the co-op never paid a dividend. It has basically gone out of business.

Kwik'pak Fisheries, LLC, the fisheries arm of the Yukon Delta Fisheries Development Association, the local CDQ group, has taken over the co-op's equipment, and is upgrading and making a major expansion of facilities and salmon production equipment for the 2008 and 2009 seasons. In addition Kwik'pak has purchased the Bering Sea Fisheries Co., also based at the mouth of the river, and the smoke plant operation in Emmonak, previously owned by the Emmonak Tribal Council. They plan to upgrade the smoking equipment and get training in quality production.

Kwik'pak is also making an all-out effort to follow strict quality control measures, such as requiring all fishermen to ice and bleed their product. They will be stressing the use of ice on the fishing grounds, with the goal of raising the quality and reputation of lower Yukon River kings and chums.



Yukon Delta Products, Emmonak

Yukon Delta Products was a small value-added processing plant in Emmonak owned by the Emmonak Tribal Council. A state grant in the late 1990s provided funding for the plant's buildings and equipment. The facility was purchased as a modular unit in vans. A small office building was added, and a refrigerated freezer van served as a cold storage.

The plant did not have a primary processing permit and didn't purchase directly from fishermen. Instead it purchased headed and gutted fish from the Yukon Delta Fish Marketing Coop and other Lower Yukon River processing operations. Frozen H&G fish were stored for later thawing and processing.

The plant produced hot-smoked vacuum-packed smoked salmon fillets. Steps in the production process included thawing, filleting, soaking in brine, drying, smoking, vacuum packing.

The facility was operated by a full-time manager with extensive earlier experience in fish processing, and employed as many as ten workers at peak periods.

Despite producing good quality products, the plant faced several problems. Costs of operation were high, and some of the original equipment purchased with the plant did not work. The operation had problems marketing its products in a very competitive marketplace, especially given the cost of flying its products to market.

After sitting idle for several years, the plant but has been taken over by Kwik'pak Fisheries, LLC, the fisheries arm of the Yukon Delta Fisheries Development Association, the local CDQ group, which has plans to upgrade equipment and begin operations in 2008.



Yukon Delta Products modular smoker processing facility. The wooden building on the right was the processor office.

Unalakleet Fish Plant

Several locally-owned fish processing plants have operated in Unalakleet since the 1960s. The first plant was destroyed by a flood. A second plant was built in 1968 with assistance from the Community Enterprise Development Corporation. In 1973, Unalakleet fishermen organized the Norton Sound Fishermen's Co-op (NSFC) which purchased the plant and began operations. During the mid-1970's the co-op was profitable for several years and created up to 60 processing jobs. In 1978, the co-op expanded operations and almost tripled purchases, buying fish from beyond Norton Sound, but lost money due to greatly increased costs.

Facing growing competition for fish from cash buyers, the co-op stopped operating in the early 1980s. In 1984 the Unalakleet Native Corporation took over the plant. From 1986 through 1992 Whitney Fidalgo leased the plant from the Native Corporation and operated it only as a fish buying station. Over time the plant deteriorated physically. In 1993 a grant from Norton Sound Economic Development Group (NSEDC), the CDQ group for the region, paid for renovations, and NSEDC used the facility to head and gut kings, chums and cohos for sale on the fresh market.

In the late 1990s, the old plant was torn down and a new \$2 million plant was constructed with state and federal grants. The new plant is owned by the Native Village of Unalakleet and managed by Norton Sound Seafood Products (NSSP), a subsidiary of NSEDC. NSSP also operates several other seafood processing facilities in the region. The new plant began operating in 1998. The first years of operation of the new plant were not profitable but the plant was able to continue operating with financial backing from NSEDC, and purchased smoking equipment for value-added processing.

The Unalakleet airstrip has a 6000' runway, capable of handling jet service, although there is not current jet service. This could potentially lower the cost of flying fresh fish to market.



Unalakleet Fish Processing Plant in April, 2000. The main processing area is in the tall part of the building.

APPENDIX A. OTHER INFORMATION SOURCES

There are many organizations, publications and web-sites that can provide you with information and assistance in planning a fish processing plant. Here are several good starting places. A search of the web-sites of these organizations will lead you to many other useful sites and organizations.

Alaska Sea Grant Marine Advisory Program (MAP)

www.marineadvisory.org

Marine Advisory Program agents are University of Alaska faculty who live in 11 of Alaska's coastal communities and work on issues important to local residents. They have written many publications to assist Alaska seafood processors and fishermen. Some of the most useful publications for planning small processing plants include the following:

- *Planning for Seafood Freezing. 2008*
<http://seagrant.uaf.edu/bookstore/pubs/MAB-60.html> This manual helps seafood processors plan freezing operations in order to maintain the high quality of fresh fish in a frozen product. It includes the physics of freezing, selection of equipment, and important food science concepts. The book is useful to catcher-processors, seafood plant managers and engineers, refrigeration contractors, and others. Author Ed Kolbe contributes engineering expertise, and Don Kramer offers knowledge of optimum seafood quality, based on decades of academic and extension accomplishments.
- *Planning Seafood Cold Storage. 2006*
<http://seagrant.uaf.edu/bookstore/pubs/MAB-46.html> Seafood processors, port managers, and city planners will find the information they need for deciding how to develop a cold storage facility. Information is provided on controlled freezing, transport, and storage. The authors provide well-designed, up-to-date cold storage facilities that will support local processing of high quality and affordable seafood. The third edition targets one-million-pound units and smaller, to store product at –20°F. Authors Ed Kolbe and Joe Junker offer engineering expertise, and Don Kramer contributes information on optimum seafood quality.
- *Fishermen's Direct Marketing Manual. 2007*
<http://seagrant.uaf.edu/bookstore/pubs/MAB-53.html> This book provides information on how to work through the steps involved in direct marketing—selling seafood products further up the distribution system than to the local processor. Chapters in this book address finding those domestic and international customers, strategies for distributing seafood, packaging and shipping, and the basics of business planning. The 4th edition expands on previous versions, with new sections on accounting, e-commerce, working with custom processors, direct marketing shrimp, avoiding HACCP problems, and more. Regulations and technology have been updated as well.

- *Tips for Direct Marketers: The Onboard DEC Inspection. 2007*
<http://seagrant.uaf.edu/bookstore/pdfs/asg-45.pdf> Written by Torie Baker for Alaska fishermen with direct market permits, this publication informs captains of vessels who process their own fish, how to prepare for an Alaska Department of Environmental Conservation inspection. Operators are advised to have paperwork in order, and to demonstrate that they follow hazard analysis and sanitation protocols. In addition, the inspection is a good opportunity to discuss health aspects of new ideas for fishing business growth, with the DEC inspector.
- *Recoveries and Yields from Pacific Fish and Shellfish. 2004.*
<http://seagrant.uaf.edu/bookstore/pubs/MAB-37.html> Fishermen, seafood plant managers, and seafood marketers will tables including information for more than 65 species of Pacific fish and shellfish. Average percent recovery is given, from starting material (e.g., raw whole) to end product (e.g., cooked meat). Written by Chuck Crapo and Brian Paust.
- *Air Shipment of Fresh Fish: A Primer for Shippers and Cargo Handlers.*
<http://seagrant.uaf.edu/bookstore/pubs/MAB-32.html> Written by Chuck Crapo and Brian Paust. Marine Advisory Bulletin No. 32 (Revised 1991).
- *Care and Handling of Salmon: The Key to Quality. MAB-45* Written by John Doyle. Marine Advisory Bulletin No. 45 (1995). This is the gold standard book on salmon quality.
- *Care of Halibut Aboard the Fishing Vessel.*
<http://seagrant.uaf.edu/bookstore/pubs/MAB-18.html> Written by Donald Kramer and Brian Paust. Marine Advisory Bulletin No. 18 (1985).
- *White Fish Processing Manual.* Compiled by Chuck Jensen. Marine Advisory Bulletin No. 28 (1987).

These and other Marine Advisory Program publications are available from:

Alaska Sea Grant College Program
 University of Alaska Fairbanks
 Fairbanks, Alaska 99775-5040
 907-474-7086 (telephone)
www.uaf.edu/seagrant/bookstore

or

Marine Advisory Program
 1007 West 3rd Ave, Suite 100
 Anchorage, AK 99501
 Phone: (907) 274-9691
 Fax: (907) 277-5242
 E-mail: map@sfos.uaf.edu

Alaska Seafood Marketing Institute (ASMI)

The Alaska Seafood Marketing Institute (ASMI) has a wealth of information and materials (including free videos) which can assist you in planning your marketing and in producing quality products. Much of this information is available on the ASMI website at www.alaskaseafood.org.

You can also contact ASMI at:

311 N. Franklin Street, Suite 200
Juneau, AK 99801-1147
(800) 478-2903
(907) 465-5560
Fax: (907) 465-5572
www.alaskaseafood.org

Alaska Department of Fish and Game (ADF&G)

The Alaska Department of Fish and Game has detailed data on commercial fisheries landings. Contact your area management biologist about the best way to obtain information for your area.

The Alaska Department of Fish and Game also compiles data from the Commercial Operators Annual Reports (COAR Reports) filed by processors each spring. You can use this data to get a sense of the average prices processors earned for different products in your area in past years. This information is not published but is available upon request from the Department. For more information contact:

Alaska Department of Fish and Game
Division of Commercial Fisheries
1255 W. 8th Street
Juneau, AK 99801
P.O. Box 25526
Juneau, AK 99802-5526
Phone (907) 465-4210
www.cf.adfg.state.ak.us

Alaska Department of Revenue, Tax Division

The Alaska Department of Revenue's Tax Division compiles an "Alaska Salmon Price Report" which shows the average wholesale prices that Alaska processors received for different salmon products and the total sales volume by larger processors. There is both an annual report and a report showing monthly sales and prices which is released three times per year. The reports are available on the Tax Division's website at:

<http://www.tax.alaska.gov/programs/reports.aspx>

Alaska Office of Fisheries Development

The Office of Fisheries Development in the Alaska Department of Commerce, Community and Economic Development has a number of programs supporting economic development of Alaska's seafood industry. More information about these programs may be found at the Office of Fisheries Development website at:

www.commerce.state.ak.us/oed/seafood/seafood.cfm

or by contacting:

Office of Fisheries Development
Dept. of Commerce, Community and Economic Development
PO Box 110804
Juneau, Alaska 99801-0804
Phone: (907) 465-5464
Fax: (907) 465-3767

Economic Development Administration

The federal Economic Development Administration, which sponsored this handbook, supports a wide variety of economic development projects in rural Alaska. For more information, contact:

Economic Development Administration
510 L Street, Suite 444
Anchorage, AK 99501
(907) 271-2272 (telephone)
907-271-2273 (fax)

APPENDIX B. SELECTED SUPPLIERS OF EQUIPMENT AND SERVICES

This appendix lists some of the companies which supply equipment, supplies or services to western Alaska fish processing companies or who are processors themselves. Many of these companies helped to supply information for this handbook. While they are by no means the only companies you may wish to work with, they may be a good starting point to contact for information as you plan your processing plant.

Many of these companies have websites which provide extensive information about their products or services. These websites can usually be found by doing an internet search on the company name.

Alaska Warehouse Equipment and Supply

7720 Schoon Street

Anchorage, Alaska 99518

907-522-3842

Forklifts, hoists, pallet jacks, generators

Alaska Village Electric Cooperative, Inc.

4831 Eagle Street

Anchorage, AK 99503

907-561-1818

Assists with analysis of rural electric costs for commercial operations

Arctic Transportation Services

Offices: Bethel - 543-3652; Aniak - 675-4295; Kotzebue - 442-3347; Nome - 443-5482

www.atsak.com

Air cargo - schedule & charter. CASA's, 207's and Skyvan. Freight service in rural Alaska.

Carnitech U.S. Inc.

2001 West Garfield

Pier 91 - Bldg A-1

Seattle, WA 98119

206-781-1827

Large array of mechanized processing equipment and processing line components, plant design and layout assistance

Coastline Equipment, Inc.

2235 E. Bakerview Rd.

Bellingham, WA 98226

360-734-8509

Wide assortment of mechanized processing equipment and processing line components, plant design and layout assistance

DACO

18715 East Valley Highway
Kent, WA 98032-1241
1-800-345-3226

Totes, tubs, sanitation supplies, conveyor systems, general material handling equipment.

Dan O'Neil

The Fisheries Network
24001 Crystal Lake Rd.
Woodinville, WA 98072
425-483-1915

Sanitation and janitorial supplies for fish processing. Networks processors with manufacturers and sellers of complete line of equipment, supplies, and services

Dixie Canner Company

786 East Broad Street
Athens, GA 30601
706-549-1914

Can packaging and processing equipment

Enviro-Pak

15450 S.E. For Mor Ct.
Clackamas, OR 97015
1-800-223-6836

Food processing smokers, ovens, and dryers in several sizes and configurations for fish and meat processing

Frontier Paper Inc.

1848 Ship Avenue
Anchorage, AK 99501
907-272-4000

Packaging and sanitation supplies used in fish processing - Boxes, pails, gel ice and more

Hobart Food Equipment

C/O JMR Company, Inc.
District Sales Agency
219 E. 51st Avenue
Anchorage, AK 99503
907-563-3100

Food processing equipment including meat processing and packaging equipment

Hydra-Pro

4259 22nd Ave W.

Seattle, WA 98199

206-285-9579

Hydraulic cranes and other hydraulic machinery and equipment

Indian Valley International - Training School

Indian Valley Meats

HC 52 Box 8809

Indian, AK 99540

907-653-7511

Meat, fish, and game processing – commercial and custom. Training courses available.

Training programs for village fish and game processing operations

Larsen Consulting Group (Civil Engineers)

3710 Woodland Dr.

Anchorage, AK 99517

907-243-8985

Construction engineering with rural Alaska processing plant design experience

Movers Inc. Air Freight

4041 W. International Airport Road

Anchorage, AK 99502

907-243-4305

Northern Air Cargo

3900 W. International Airport Road

Anchorage, AK 99502

907-243-3331

800-727-2141

Scheduled and custom air cargo service throughout Alaska - special fish season rates

Toledo Scale Company of Alaska

6727 Greenwood St.

Anchorage, AK 99518

907-344-2134

Scales of all sizes used in fish processing and fish unloading

Redbow Industries

P.O. Box 775

Redmond, WA 98073

425-376-2827

Design, fabrication, and supplier (sales agent) of seafood processing equipment

Ribelin Lowell & Company Insurance Brokers, Inc.

3111 C Street, Suite 300
Anchorage, AK 99503-3925
800-478-1251

Full line of insurance for all kinds of businesses including seafood processing

Robert Reiser & Co., Inc.

725 Dedham Street
Canton, MA 02021
781-821-1290

*Vacuum packaging and automatic brine and flavor injecting equipment
Freight forwarding by air, truck, and ship including consolidation, shipping, and tracking*

University of Alaska Marine Advisory Program

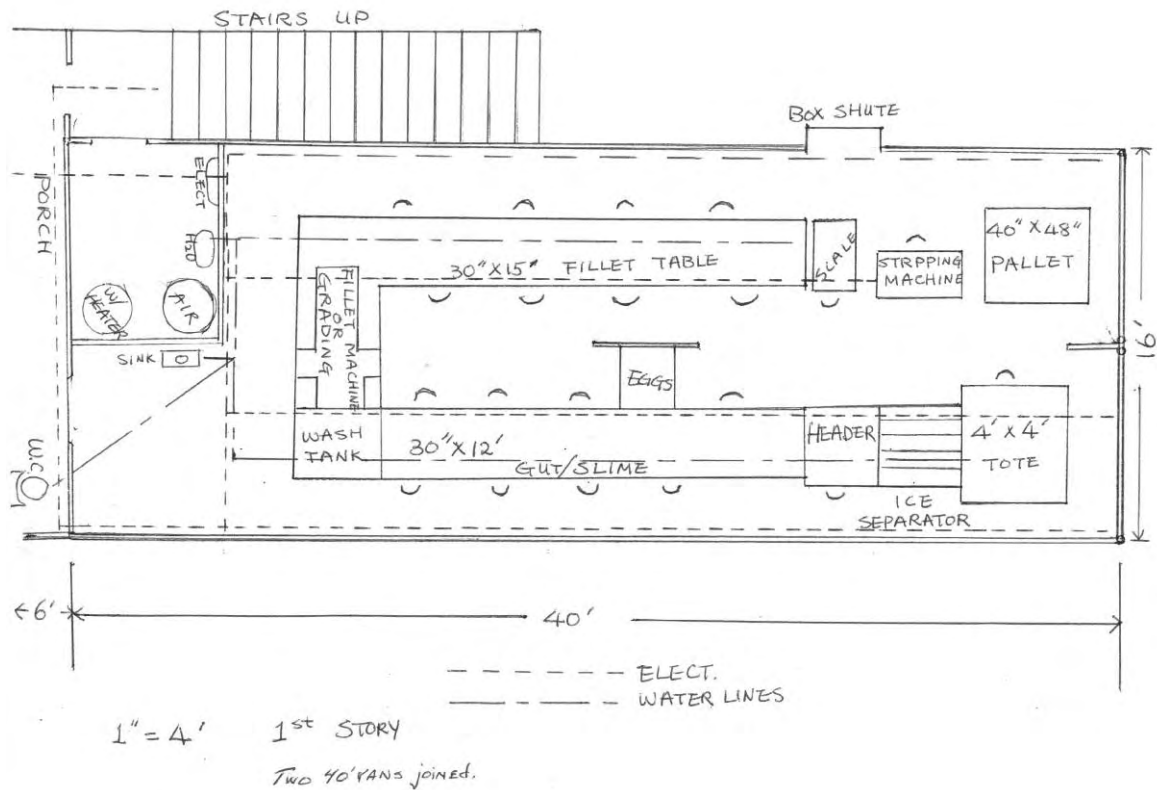
1007 West 3rd Ave. - Suite 100
Anchorage, AK 99501
907-274-9691

Training courses in HAACP, Better Process Control (canning), sanitation practices, and quality assurance/quality control. Specialized training and consulting in best processing practices, fish smoking, and shelf life extension.

APPENDIX C. DESIGN FOR A PREFABRICATED PROCESSING PLANT

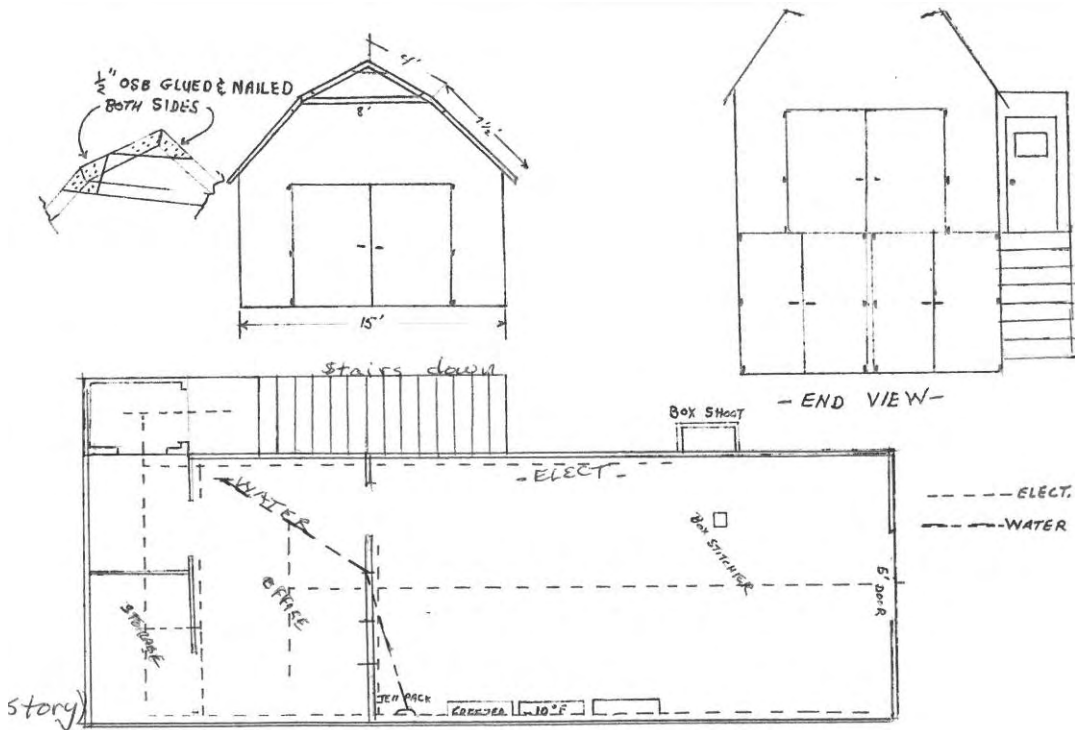
This is an example of a prefabricated fish processing plant building which can be shipped to a rural location with all equipment needed to be operational. The building is composed of two 40' vans. It includes trusses for creating a second story once the two vans are attached.

Salmon are brought into the first floor in totes and dumped onto the ice separator. It is then moved through the header, along the table or conveyor for gutting/sliming and into the wash tank. It then goes to a grading table, if H&G is the targeted product, or to an automatic fillet machine. As fillets exit the automatic machine, they are conveyed along the fillet table for additional processing (trimming or bone removal), placed in a box and onto the scale, and then strapped and placed on the pallet, and shrink wrapped for transport.



The eggs are removed during the gutting process, and taken to an egg processing room, if sujiko or ikura is to be manufactured (as illustrated in Appendix E).

The second floor (shown below) is for an office, storage, and making jell pacs. There is large open area for constructing boxes, where they are then dropped down the chute to the final packing area on the first floor.



The following two pages provide a comprehensive list of the equipment needed to operate the plant, all of which would be shipped with the plant. The approximate total cost of the vans and enclosed supplies is \$150,000.

This plant concept was designed by Doug Drum of Indian Valley Meats. He can be reached at 907-653-7511.

Comprehensive Equipment List for Prefabricated Processing Plant

PLANT		50 gal.	Clori Clean
		1	3-gal. Quat Sprayer
1	Table 30" x 15' Fillet	10 gal.	Quat
1	Table 30" x 12' H&G	100 ft.	Water Hose
1	Table 36" x 5'	3	Squeegees 36"
1	Wash Tank 36" x 36"	3	Push Brooms 24"
1	D-Icer 36" x 36"	2	Reg. Brooms
	First Aid Kits or Station Kit	6	30 gal. Trash Cans (plastic)
	Fire Extinguisher	6 cs.	Trash Liners
2	Freezer Van	12	Scrub Brush
2	Dickerson 7-Day Recorder & Chart	1	Mop Bucket
		12	Mop Heads
2	Toyo Stove	3	Mops
1	Header Machine		
1	Fillet Machine		
1	Waste Grinder with Pump		
1	Egg Table 2' x 30"	1	Electric Panel 200 amp
2	Digital Bench Scale	1	10' Grounding Rod with Wire & Acorn Nut
2	Digital Brailer Scale		
3	Tape Gun	10	20 amp Breaker
36	Rolls of 2" Clear Tape	7	15 amp Breaker
1	Strapper	2	220v 40 amp Breaker
6	Strap rolls	1	2" x 10' Conduit
1	Box Stitcher	1	2" LB 90 Degree Angle
1	Double Vacuum Sealer	1	200 amp Switch
1	Vacuum Seal Material	1	Meter Box
1	Gel Pack Machine	1	2" Weather Head
1	Gel Pack Materials	3	2" Conduit Clamp
2	Pallet Jack	1	Wire Puller
1	Cherry Picker	250 ft.	3/4" Conduit
1	Ice machine	100	3/4" Conduit Connector
6	Shovels	50	3/4" Conduit Cuplors
3	Freezer 8'	500 ft. ea.	Red, White, Black, Blue 12/2 THHN
1	Air Compressor		
1	Chlorinator	500 ft.	12/2 Electrical Wire
1	Chemical Foamer	50 ft.	3/6 Electrical Wire
	Shrink Wrap	300 ea.	Wire Nuts (yellow, red, blue)
	Toes with Lids	300	Romex Wire Staples
	Insulated Totes	50	Single Gang Metal Box
10	50" Luger	4	Double Gang Metal Box
12	Roe Knife	4	Security Sensor Street Light
12	Steel	4	75 watt Street Light
12	Scabbers	1	200 amp Panel
100	Aprons	35	Recepticals
36	Hard Hats	6	GFCI Receptical
25	Rubber Floor Mats	24	Single Pole Switch/Cover
500	Hair Nets	48	Single Gang Box
24	Wire Gloves	8	Double Gang Box
144	Cotton Gloves	8	4-Gang Box
2 doz.	Heavy Duty Rubber Gloves (clean-up)	25	Light Box
		12	Water Tight Cover Light (plant)
2	Boot Dip Boxes		
	Boot Dip Chemical	6	Cover Light (loft)

ELECTRICAL

3	Ceiling Lights	10 lbs.	Ring Nails
		92	2"x 8"x 8' Rafters
OFFICE		?	Insulation
		6	36"x 48" Window with screen
2	Computers	1	Double Wide Pre-hung Door
	Web Can,	6	3"x 3" Door Hinges
	Security Alarm	2	3' Exterior Doors (pre-hung)
	Battery Back-up	6	3' Interior Doors (pre-hung)
	Fax Machine	20 gal.	Paint Sealer
	Printer	20 gal.	Paint Sealer
1	VHF Radio & Power Pack with Antenna	5.75 yds.	Cement (for floor) 2" High Strength with Fiber
6	Hand Held Radios	6	20' all-weather board for Stairs/Risers
1	Time Clock Time Cards		Railroad Ties
	Surge Protector	12	Hurricane Strap
2	Phones	46	2 1/2" Deck Screw
1	Labeler	5 lbs.	
36 rolls	Printed Labels		
2	Calculators		PLUMBING
2	Filing Cabinets		
1	Marker Board	1	Water Filter System
2	Desk	1	Hot Water Heater
2	Desk Chair	3	Hand Wash Sink
	Paper, Pencils, Pens, Markers, etc.	3	Supply Line (for Sink)
		1	Hose mixing faucet with back flow vent
14	Chairs		Hot Water Wash Down Hose
2	Tables 6'	75 ft.	Insulated Spray Nozzles
1	Coffee Maker	3	Floor Drains with Covers
BUILDING MATERIALS		2	4" ABS Pipe
		40 ft.	4" ABS 90's
		4	4" ABS Tee
2	40' Van (skinned/lined with fiber)	1	4" ABS Couplers
24 ft.	Vinyl Curtain Door with Holders (Plant)	4	Grease Trap
16 ft.	Vinyl Curtain Door with Holders (Freezer Vans)	1	Cleaner
140	1/2" OSB		Glue
120	2" x 4" Stud (outside)	300 ft.	Blue 3/4" PEX Pipe
50	2" x 4" Stud (inside)	300 ft.	Red 3/4" PEX Pipe
1200 sq. ft.	Metal Roof		PEX Crimper
1200 sq. ft.	Metal Wall (or leave wood and paint)		PEX Hanging Strap
1	156' Drip Cap	50	3/4" PEX Clamp
1	40' Ridge Cap	100	3/4" PEX Tee
	Screws	50	3/4" PEX 90's
30	3/4" TG (flooring)	50	Male Connectors
45	2" x 8"x16' Floor Joists	50	Female Connectors
20 lbs.	Teeko Nails	25	Valves
		1	100 gal. Fuel Tank for Toyo
			Fuel Line Materials

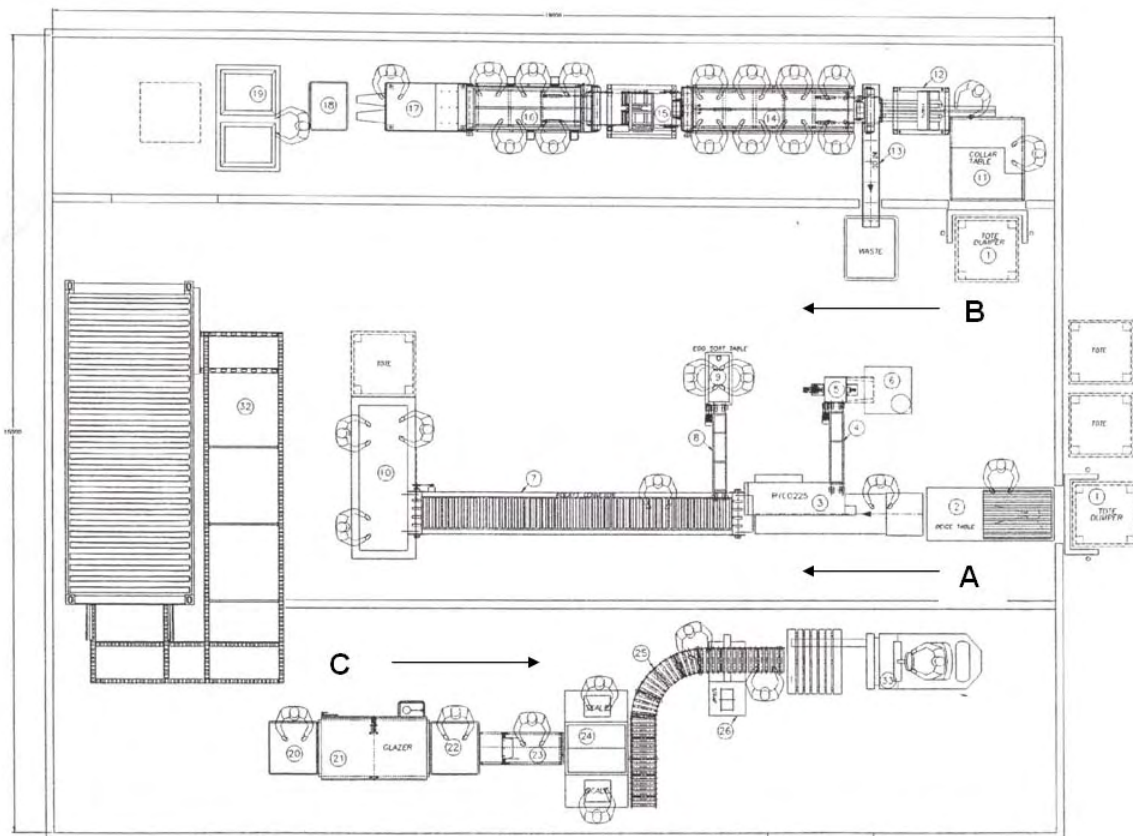
APPENDIX D. SAMPLE LAYOUT FOR A FISH PROCESSING PLANT

This is an example of a processing plant layout for salmon H&G or fillet production in a single story plant. The salmon are brought in totes and (A) dumped onto the deicing table and are fed into a heading machine (or alternatively to a heading table if heading is done manually). The heads are transferred to a grinder, the eggs are removed, and the carcass moves down a conveyer. The fish are slimed and placed onto a sorting table.

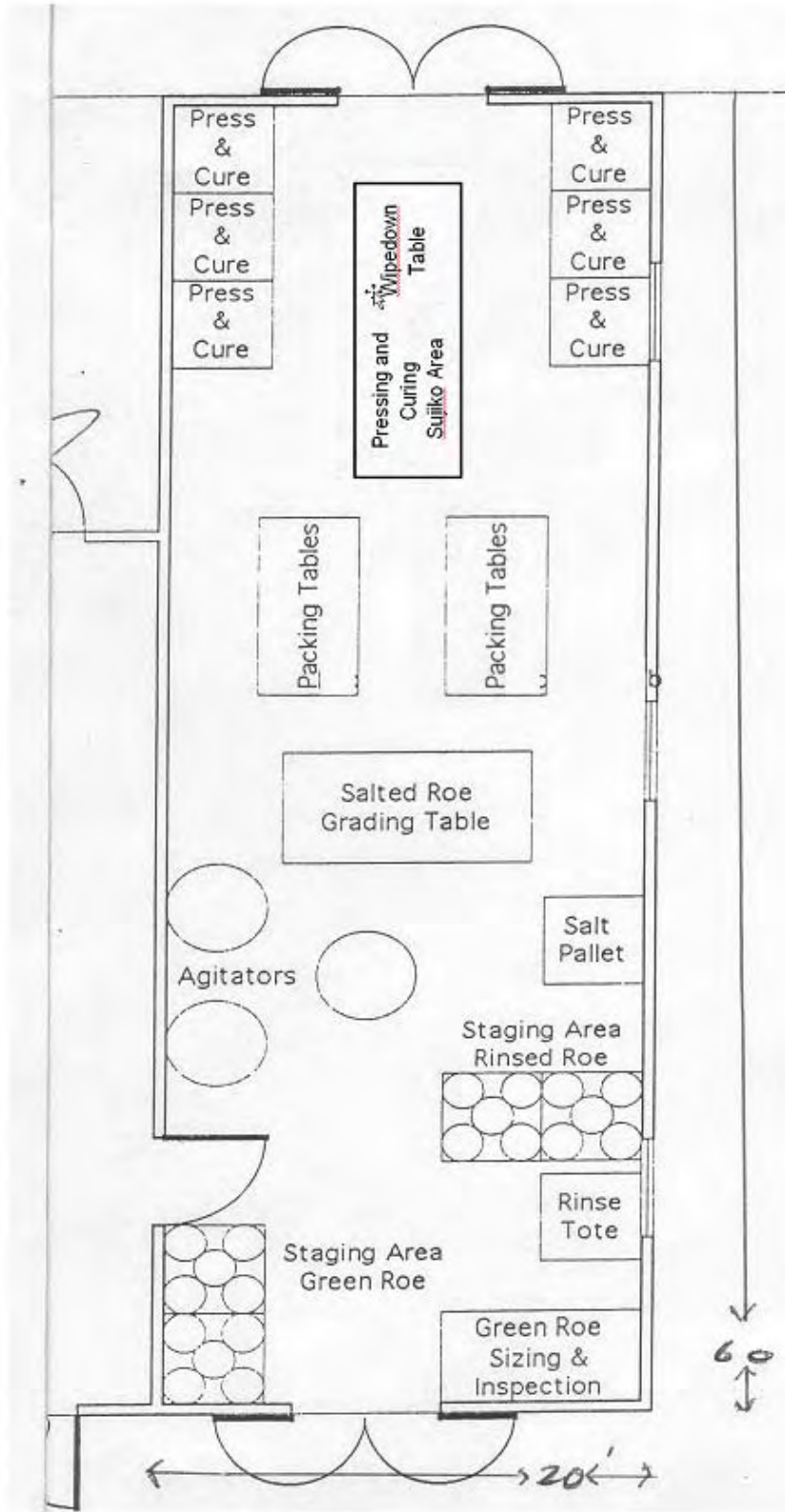
They then move to the next line (B) and are dumped onto a table for collaring and then into an automatic fillet machine. The fillets move down a trim table and through a pinbone removal machine. The fillets are then checked for quality and then placed into bags for freezing or into fillet boxes for fresh shipment.

A third optional line is shown (C), if the salmon are being sold H&G frozen, they can be glazed, bagged, weighed, boxed and strapped for shipment in a third optional line (C). Removing the glazer from the design, the layout may alternatively be used for weighing, boxing and strapping for fresh shipment.

This processing layout was designed by Carnitech US, located in Seattle (www.carnitech.com).



APPENDIX E. DESIGN FOR AN EGG PROCESSING ROOM



This is an example of a design for a salmon egg (sujiko) processing room. The room could be included in the main processing room, if space is available, or as an attached space, which would be preferable.

This 60' x 20' space allows all stages of the roe processing to occur together. The green (fresh) roe is brought from the slime line to the holding area, for sizing and inspection.

It's then rinsed, and situated near the agitators, along with a salt supply, to be brined for an exact amount of time, depending upon temperature and egg size.

Then it will be removed and taken to the pressing and curing area, where it will be held for a couple days. Finally, it will be packed and labeled and palletized for shipment.

