

**INTRODUCTION TO THE
BOTTLED WATER
BUSINESS**

**WRITTEN FOR ENTREPRENEURS
ENTERING THE BOTTLED WATER BUSINESS
IN THE U.S. OR ABROAD**

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MISSION STATEMENT

The Norland Int'l. Inc will drive cutting-edge innovations and industry-leading service to ensure entrepreneurs can maximize their opportunities to succeed.

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Historical Background

The roots of the bottled water industry can be traced to the ancient Romans, whose interest in mineral water led to the establishment of spas and thermal baths in Italy, as well as in foreign countries visited by Roman soldiers. The Romans established and used spas all across Europe, as evidenced by ancient coins found at various spa locations.

Over time, European mineral waters became recognized for their mineral content and believed curative benefits. Famous European mineral water spas were developed, such as Perrier, Evian, Vittel and Apollinaris. For centuries, Europeans have traveled to these natural mineral water spas to “taste the water” and to seek curative effects from ailments such as arthritis, kidney stones, digestive disorders or respiratory problems. The health benefit was often attributed to specific minerals found in the waters, such as calcium, magnesium, potassium, and sulfur.

The curative health aspect of the European spas resulted in the development of some luxurious hotel complexes around these waters at the turn of the last century. With the development of rail transportation, the spas became an important part of the social fabric of the wealthy, who could travel long distances to visit spas such as Contrexeville in France, San Pellegrino in Italy, Spa Reine in Belgium and Apollinaris in Germany. Ultimately, mineral water was bottled, thereby providing a means by which more Europeans could access the beneficially perceived water without incurring the expense of travel and accommodations. Regulations were developed across Europe to grant special recognition to natural mineral waters and to ensure that their natural mineral content remained unaltered during the extraction and bottling process.

As the Europeans came to the New World, they brought their mineral waters and their mineral water traditions with them. European style spas flourished in the New World – across present-day North America, Central America and South America. For example, famous spas were developed along the eastern coast of the U.S. in Saratoga Springs, New York; Hot Springs, Arkansas; Warm Springs, Georgia; and Poland Springs, Maine. In Brazil, a great diversity of geologic conditions and hot water sources fostered the development of spas such as Sao Lourenco in the State of Minas Gerais, and Lindoia and Campos do Jordao in the State of Sao Paulo. However, the native population of these regions frequented springs long before the Europeans arrived. For example, in Mexico, the hot mineral springs of Tehuacan were known by the Aztec Indians for their healing powers years before the Spanish conquest of Mexico. Native Americans originally used many of the springs in North America.

The spas in the New World attempted to emulate the European approach, including advertising the curative aspects of their waters. However, by the mid-1900s, many of these spas had fallen into disuse. Today, those few remaining spas have been developed as recreational facilities, without particular emphasis on the spring or mineral water. In contrast, many of the spas in Europe remain in existence. Three reasons for the disappearance of spas from the North and South American landscape include:

- Water sources with the desirable high temperatures and mineral content are relatively rare, especially on the East Coast of the United States.
- The United States public has questioned the curative properties of mineral waters, thereby making related claims forbidden by the U.S. Food & Drug Administration (FDA).

- General costs associated with operating spa-related hotel facilities have exceeded the consumer's desire to pay for them.

The bottled water industry in the U.S. had a very slow start. In the East, the use of bottled water was unnecessary because high-quality water was plentiful. Bottled water operations that did exist were typically small family businesses serving local markets. It was not until the late 1800s and early 1900s when the southwestern region of the U.S., particularly southern California, was settled that bottled water took on some economic importance. Here, the question of water supply and water quality for a growing population spurred the development of two of the largest U.S. bottled water companies, Sparkletts and Arrowhead, with both companies delivering 5-gallon (19-liter) glass bottles of water, at that time using a uniquely American packaging format. Ultimately, the market that evolved in the U.S. was not the traditional European mineral water market, but consisted predominantly of drinking water with relatively low mineral content. Today mineral water represents a very small portion of the bottled water market in the U.S.

In contrast to the U.S., the mineral water tradition remained the cornerstone of the European and South American markets. The differences in the development of these bottled water markets are the key to understanding the dynamics of the regulatory environment for bottled water today.

Recent Developments

Sales of bottled water today can be traced to two separate, but related, categories of demand: (1) **the demand for safe drinking water; and (2) the demand for refreshment beverage alternatives.** These are clearly distinct categories of demand; bottled water as a tap water alternative implies commodity status, while bottled water as an alternative refreshment beverage does not.

The Demand for Safe Drinking Water. During the last several decades, the demand for safe drinking water has grown in world markets. In many regions of the world, well-founded concerns over the contamination of groundwater sources and surface reservoirs have created a base of consumer distrust of tap water quality. In all markets today, whether established or emerging, the major factor driving bottled water demand is found not so much in the curative or mineral attributes of bottled waters, but in the demand for good tasting and safe drinking water. This translates into a much stronger market incentive than in the past. Because contemporary markets are linked strongly to distrust and documented source contamination, **significant market potential exists in the urbanized industrial regions of the world.** This is manifested in many ways throughout the world as consumers seek alternatives to tap water:

- In the United States, the bottled water industry has generally enjoyed double-digit growth over the past two decades, fueled in large part by those products catering to the demand for tap water alternatives (3-5 gallon), as well as single-serve, PET bottled waters.
- Over the past two decades, the 3-5 gallon (19 liter) business has been introduced and has made significant inroads into many global markets including Canada, Mexico, South America, Australia, the Middle East, and Southeast Asia, particularly the Philippines, Thailand and Indonesia.

- Europe, although always strong in its natural mineral water tradition, is just beginning to witness growth of the 3-5 gallon (19-liter) water delivery business, which was introduced in the early 1900s.
- In the early 1900s, MERCOSUR, the Southern Cone Latin American trade group, enacted regulations permitting processed drinking waters to be bottled and marketed, where mineral water was previously the only bottled water permitted in the market.
- The demand for safe drinking water has also fostered development and strong growth in the Point of Use (POU) industry.

The Demand for Alternative Refreshment Beverages. Consumers are turning to bottled water as a refreshment beverage alternative, fueled by increasing concern about health and fitness, and greater consumer education about the ingredients in food and beverages.

- The bottled water industry has been the fastest growing segment of the beverage industry in many world markets for nearly two decades.
- Major soft drink companies have introduced bottled water products, carbonated water products and other healthy alternatives recognizing the demand for replacing sodas and other more sugary drinks. Pepsi-Cola® and Coca-Cola® are introduced a processed (purified) still drinking water to international markets under the names Aquafina® and Dasani®, respectively, and have even focused their attention on their core products while cutting their less-healthy, less profitable brands.
- Sales of still and sparkling bottled water in single-serving packages through on-and-off-premise retail outlets have flourished in recent years in many world markets.

Bottled water producers are working to create consumer perceptions about their products with emphasis on long-term brand building, rather than simply supplying a commodity.

As part of the brand building efforts, bottlers are adopting different strategies, with some focusing their brand's position on the water source (especially in the case of natural spring or mineral water companies), and others focusing on quality, highlighting the steps and technologies used to produce their products, from the source to the bottle.

The PET bottle has been the primary vehicle for creating and meeting the demand for water as a refreshment beverage. James Stephens, an industry executive, states in an article published in *Beverage Industry's Annual Manual*, (1996/97), that:

PET has transformed bottled water from simply water into a beverage alternative. It is the original and most successful New Age Beverage. Its convenient size made bottled water widely available, encouraging impulse purchase. Consumers know it's about the healthiest and most refreshing of all beverage choices. The advent of PET-bottled water allowed people to see many others placing a bottle of water, just like other popular beverages, right to their lips – an image that I don't think can be overhauled.

Thus, as the bottled water industry worldwide continues to move forward, the business will be principally driven by the need for clean and safe drinking water and the consumer's desire for a beverage alternative. These factors should provide an opportunity for growth well into this new century.

Wholesalers/Distributors. Beverage wholesalers/distributors, such as wine and beer distributors, and soft drink bottlers are often employed by bottled water companies. These distributors are experienced in the beverage trade and have warehousing capabilities, the physical delivery system and customer accounts in place. While this method may allow for extensive retail level exposure, a bottled water product may not be given the highest priority and total trade margins will be relatively high. However, this distribution channel may prove most effective for on-premise accounts and independent off-premise retailers that tend to be small, fragmented accounts with limited storage, requiring frequent sales calls and deliveries.

Direct Distribution. The water bottler may contract directly with large off-premise retailers such as supermarkets, hypermarkets, deep discounters and wholesale clubs. These retail outlets are increasingly contracting directly with bottlers, bypassing the wholesaler/distributor and their associated margins. Facilitating the direct channel between these accounts and bottlers are Electronic Data Interchange (EDI) and store door delivery, often circumventing the need for and costs associated with distributors, brokers and warehousing.

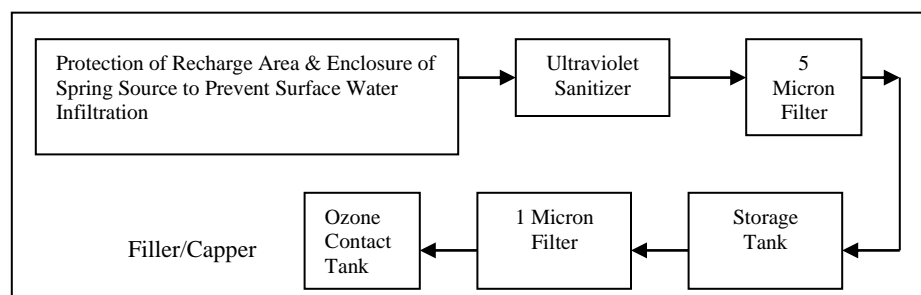
Direct distribution is the primary channel for the 5-gallon (19-liter) business, which requires various types of delivery vehicles and service personnel to deliver and pick up the returnable bottles. However, bottlers may sub-contract with specialized distributors to provide service to accounts in remote locations.

Brokers. The water bottler may select a food broker that represents various manufacturers to retail outlets. A food broker has its own sales force in the field that calls on accounts. Brokers receive a sales commission, generally much less than the distributor/wholesaler margin. A broker system requires the bottler to maintain warehouse inventories and provide or secure delivery to the customers' distribution centers or outlets. It also requires that the bottlers invoice the accounts and manage receivables.

WATER SOURCES FOR BOTTLED WATER OPERATIONS

The natural spring water source in a very protected environment requires little treatment. Although the natural hydrogeological features of the aquifer will affect the mineral content of the water, and in some instances the biological content, on the whole, a well-protected source with a moderate mineral content such as 130 mg/l will require only minimal treatment shown in the figure below.

This table shows a typical treatment process employed in the bottled water industry for a well-protected natural spring water source of very high quality.



Water Sources for Bottled Water Operations

NATURAL MINERAL WATER

Natural mineral water is extracted from a protected source where water is collected and bottled directly at the source without any treatment to alter its natural mineral and biological components.

SPRING WATER

Natural

Water from a naturally flowing spring or pumped from a borehole hydrologically connected to the spring water source, which requires minimum treatment for bottling.

Spring Water

Spring water from a naturally flowing spring or pumped from a borehole hydrologically connected to the spring, but that requires treatment which changes the natural chemical composition of the water.

WELL WATER

Artesian

A well drilled through a “confining layer” such as clay, which, due to hydraulic head pressures, rises up the well casing to an elevation above the static level of the tapped aquifer, or flows to the earth’s surface without the aid of a mechanical pump. The latter characteristic is most desirable for marketing purposes.

Non-Artesian

A well drilled into a ground water aquifer that uses a pump or other mechanical means to withdraw water and experiences no artesian characteristics.

SURFACE WATER

Lakes/Rivers

Water drawn directly from natural surface water sources such as lakes, rivers, ponds or glaciers.

Surface

This term usually applies to man-made reservoirs (impoundments) that collect water from a system of streams.

Municipal

The source of this water can be any of the previous sources that are employed to supply publicly distributed water to a village, town or city. Typically, municipal water systems use filtration, coagulation and chlorination as treatment.

In more complex water sources, such as municipal water systems or sources that have been contaminated or are at risk, a more complex treatment system may be used, involving either steam distillation or membrane separation technology such as reverse osmosis.

During the **distillation process**, water is heated to boiling so it will vaporize, leaving bacteria, viruses and other impurities behind. As the water in the boiling chamber reaches near-boiling temperatures, a special centrifugal compressor turns on, which engages the unique non-contacted liquid ring seal. The steam from the boiling chamber flows through a baffling system and then into the compressor. The baffling system helps to remove minute water droplets that may have been trapped in the steam.

In the compressor, the steam is pressurized, which raises the steam’s temperature before it is routed through a special heat exchanger located inside the boiling chamber. The steam (under pressure) is at a higher temperature than the feedwater inside the boiling chamber.

The pressurized steam gives off its heat to the tap water inside the boiling chamber, causing this water to boil, which creates more steam. In technical terms, the steam “gives up its latent heat of vaporization” to the water inside the boiling chamber. While the steam is giving up its latent heat, the steam will condense.

At this stage, the condensed steam is considered distilled water, but it is still very hot—only slightly cooler than boiling temperature. To get maximum efficiency from the distillation system, the hot distilled water preheats the incoming feed water that will be distilled. As the incoming water is preheated, the outgoing distilled water is cooled. This allows the feed water to be preheated to within a few degrees of the boiling temperature.

The preheating of the feedwater and cooling of the distilled water are done in the specially designed pre-heater heat exchanger. The heat exchanger is designed for easier and faster cleaning than other makes of distillation systems, while still providing excellent heat transfer.

The distiller should also be able to separate the distilled water from volatile gases that may be in the distilled water. Some contaminants boil at a lower temperature than the temperature of the feed water. These contaminants are referred to as “volatile” and produce a gas when heated. By following these basic steps, high-quality distilled water can be reliably produced.

In **reverse osmosis**, the water is filtered through a very fine membrane fabric under high pressure. This system removes most salts and chemicals that may be in the source water, leaving a product that has a very low total dissolved solids content. It is often desirable to reintroduce minerals through a mineral injection system to add some taste and smoothness to the water. Depending upon the components of the raw water source, pretreatment of the water prior to entering the membranes can be quite extensive, since membranes can be subject to fouling by mineral or microbiological components.

BUSINESS DEVELOPMENT OPTIONS

Many bottled water companies engage in a number of business activities including:

- The 1-gallon business
- The cooler business (3-5 gallon or 19-liter containers)
- The convenience size business (2 liters and less)

In the United States, the largest bottled water companies are involved in all of these business activities. However, your market may lend itself to only one or two of these market segments.

Each of these business options is described briefly below, with some indication of material costs and capital requirements for bottling equipment for each development option. **This information is provided for illustration purposes only and to provide the reader with a preliminary idea of some aspects of the business.** It is not intended to be comprehensive. Costs and prices are in U.S. dollars and may or may not be applicable in all markets or in all situations. All costs and prices should be FOB the bottler’s plant and should include decisions or commitments and, under no circumstances, should be relied upon for business planning purposes.

- Material costs are indicative of costs that may apply to the small to medium size bottler (with annual sales in the \$500,000 to \$10 million range) in the United States market. It is assumed in all cases that bottles are purchased from outside suppliers and are not manufactured in-house by the bottler. However, it should be stressed that by the in-house production of PET bottles, one can realize a much quicker rate of return.
- Capital requirements for bottling equipment reflect new, fully automated equipment FOB the equipment supplier in the U.S. market. Equipment prices will vary depending upon type of equipment selected, bottling rates and local water conditions. For equipment shipped overseas, extra costs will be incurred for shipping, handling, customs duties and excise taxes.

Not included in these discussions are:

- Capital requirements for plant and property. Costs can vary significantly depending on many factors, including market rates for commercial real estate; the water source; space requirements for warehousing of raw and finished product; bottling lines; water storage and treatment systems; and truck loading.
- Capital requirements for ancillary systems, such as compressed air, carbon dioxide, warmers, cooling towers, electrical controls, and storage systems for raw material and finished products.

The 1-Gallon Business

The 1-gallon bottled water product is common to the U.S. market. It is relatively low priced on a per gallon basis, with low cost high-density polyethylene (HDPE) packaging material.

The 1-gallon bottled water product is a high volume, price-sensitive product. The 1-gallon bottle is produced for the off-premise retail market and is primarily distributed through supermarket chains. Some bottlers produce their own brand as well as co-package private label brands for the supermarkets. Since the 1-gallon market is extremely competitive and demand is price sensitive, bottlers depend on high volume sales to be profitable.

Hypothetical raw material costs for 1-gallon bottled water products are presented below. Bottle costs reflect purchase from an outside supplier rather than in-house blow molding. In addition to material costs, the ultimate retail price of the product should cover the bottler's profit, all other operating costs (both fixed and variable), and all margins/costs that must be paid along the distribution chain. For those contemplating a start-up operation, a price structure should be fully developed for each product and for each major distribution channel.

The Cooler Business

In addition to revenues from the sale and delivery of water, the cooler business offers incremental income from the rental of coolers, the sale of associated items (cups, etc.) and the opportunity to develop synergies by offering office coffee or tea service (OCS) to commercial accounts. All of these incremental activities offer a cooler business the opportunity to be profitable.

In general, the coolers, brewers, 3-5 gallon bottles and coffee pots may be leased, sold or given to the client for the client's use. In general, coolers are leased to the client, bottles are provided with or without returnable deposit, brewers are installed for the client's use free of charge, and coffee pots are

sold directly to the client. Typically, the coolers, bottles and brewers remain the property of the bottler and are depreciable, “returnable” assets.

The Convenience Business

Convenience bottled waters include still, sparkling and flavored, but not sweetened, waters packaged in PET plastic, PVC plastic (in some markets only), glass, cans or aseptic packages ranging from single servings to 1-1/2 or 2 liters.

The convenience category has witnessed strong growth in global markets in recent years with demand for bottled water as a healthy refreshment beverage. Single-serving sizes have become increasingly popular as impulse purchases and on-the-go consumption have increased. Major outlets for single-serving bottled waters include retail outlets of all sizes, restaurants, airlines, railroads and convenience stores. Package types include glass, plastic, cans and aseptic packages. In many respects, this unit competes directly with the soft drink segment of the beverage market.

PRELIMINARY MARKETING CONSIDERATIONS

Competition in the bottled water business has been strong over the past decade, due largely to the presence of major companies and industry consolidation. The dominance of large bottlers has been principally in major metropolitan areas. Bottled water brands remain strongly regional in nature, primarily due to the constraints imposed by the source location, the expense of shipping and the nature of the distribution system. Because of the regional tendency of the industry and the dominance of large bottlers in the more lucrative urbanized areas, opportunity still remains for smaller bottlers.

The development of a unique positioning that will appeal to target consumers requires knowledge of competitive products in the subject marketplace. No matter how attractive the industry looks in terms of growth, there is no escaping the fact that the industry is market-driven. Developing a position that will be attractive in the marketplace is crucial.

Positioning requires these main topics:

- 1) Defining the product as to its specific features, including type of water
- 2) Brand name considerations
- 3) Label presentation considerations
- 4) Packaging design
- 5) Customer services
- 6) Defining the target market for the product
- 7) Formulating a distribution strategy, including target outlets and channels
- 8) Establishing an advertising and promotion campaign
- 9) Developing a pricing strategy (incorporating ex-factory pricing; all price factors and trade margins must be covered in the ultimate retail price for product).

Price is important from two different points of view, that of the consumer and that of the bottler. A bottler’s goal may be to set prices to cover costs and then add a desired profit margin. This may lead the bottler to price himself out of the market if the price is set too high. In this case, cost control becomes very important to the bottler. On the other hand, the bottler may be charging less than the market is willing to pay. In general, the bottler must operate within the bounds of the competitive price range that currently exists in the marketplace for similar products. Only those brands that offer a unique attribute or benefit as perceived by the consumer will be able to demand a price above the normal competitive price range. In some cases, the unique benefit may be intangible, such as the name of the product or the

mystique associated with the name; in other cases, the benefit may be more tangible, such as fruit flavoring or carbonation added to the water.

A BRIEF HISTORY OF NORLAND INT'L

Norland Int'l. Inc. was first formed in early 1992 by a group of experienced investors and water treatment specialists to produce high-quality, medium cost bottled water production equipment.

Norland's experience in the water treatment and bottled water industry is extensive, both in the U.S. and abroad. Today, Norland has 135 employees and equipment on every continent in the world (except Antarctica.)

Because of Norland's worldwide marketing experience and extensive travel awareness, the company could see an increasing demand and need for a manufacturer of truly unique, reliable and cost-effective bottled water equipment. This awareness led to the development of the **Norland Bottled Water Plant**—a complete, compact and versatile micro water bottling system.

The Norland Bottled Water Plant offers specific features not normally included in traditional bottled water plants. The compact design, inherent reliability and self-maintenance features are all part of a system designed to allow the operator greater freedom to concentrate on selling and marketing bottled water—the proven activities that create financial independence.

THE NORLAND INT'L. PHILOSOPHY

It wasn't until the late 1970s that the bottled water industry began to make its unprecedented climb towards what can arguably be considered the world's fastest-growing beverage of choice. Before that time, most bottled waters in the U.S. were imported to satisfy customer demand for health or fashion considerations.

Two important factors prompted this increased demand. The first was public awareness of real problems with the quality of public drinking water supplies, fueled in part by the U.S. Safe Drinking Water Act. The second was the recognition of bottled water as an acceptable alternative to sugar-laden soft drinks as a thirst quencher.

Because of these factors, the bottled water industry has seen double-digit growth for nearly two decades, and most experts expect this growth to continue well into the 21st century.

It is important to note, however, that most of this unexpected growth was captured by larger firms such as Source Perrier of France, which saw sales growth from about **\$1 million in 1976 to nearly \$85 million in 1980—in only 4 years. By 2026, the global bottled water market is expected to reach \$267.77 billion.** Other companies such as Coca-Cola, Pepsi Co., Nestle, Poland Springs, Arrowhead, Sparkletts, Deer Park, Polar and a host of other well-recognized companies, have also capitalized on this exploding demand.

Another important factor to be aware of with this rapid growth is that it occurred mostly in large metropolitan areas where market availability could justify the cost of highly automated and expensive equipment. It was understandable that smaller, more remote communities were not able to support the

cost of a large facility and, therefore, neglected when it came to developing a locally produced bottled water.

Norland's bottled water equipment transcends this outdated thinking by offering smaller and remote communities the opportunity to establish a small, locally produced bottled water company to serve a specific geographic region and become the community bottled water supplier. This philosophy lends itself greatly to smaller communities that have traditionally shown a willingness to support their local businesses.

If you live in a remote community or an area where there is little or no bottled water, the Norland Bottled Water Plant may very well be the opportunity you've been looking for. Many industry experts believe that small bottling facilities are the way of the future. No longer can smaller communities be overlooked as a viable market segment. As shipping and transportation costs increase due to rising insurance rates, fuel costs, vehicle maintenance costs, and overcrowded or congested trafficways, the need for locally produced bottled water will continue to grow and thrive.

The demand for clean, fresh water is everywhere. Whether you live in the U.S. or abroad, it's up to you to take advantage of the newest trend in the bottled water industry.

THE NORLAND INT'L. BOTTLING PLANT

Norland Int'l. has combined several different water treatment technologies to provide its operators with reliable, consistent and great-tasting bottled water. These various technologies are well-recognized in the water treatment industry and are accepted by government agencies throughout the world.

Norland Bottled Water Plants range in size from 500 gallons per day to 10,000 gallons per day. The sizing of your plant depends on the market you intend to serve and the type of product you sell. At Norland Int'l. we offer three different categories of water packaging equipment. Each can be used separately, or you can combine technologies in order to supply several different markets. The three different categories are:

- Purified drinking water through distillation.
- Purified drinking water through reverse osmosis
- Natural spring water

1. Purified drinking water through distillation

The use of distillation as a means of purifying water has been used for centuries. By definition, distilled water is water that has been purified using nature's evaporation and condensation cycle. As water boils, steam rises; in distillation, the steam vapor is condensed and turned back into water droplets. In essence, this method removes the water from the impurities. Ancient Romans used distillation for water treatment on a small scale, but never reached the point where this method was cost-effective and reliable. Today's technology overcomes the inherent challenges associated with distillation to provide reliable, cost-effective and great-tasting drinking water. Distilled water is generally considered to be more pure than reverse osmosis water or spring waters.

2. Purified drinking water through reverse osmosis

Another popular means of treating your feed water is through reverse osmosis. By definition, reverse osmosis is a reversal of the natural phenomenon of osmosis, brought about by the application of hydraulic pressure greater than the osmotic pressure in water containing dissolved solids. This pressure

causes the water molecules to flow through the specially designed membrane and away from the dissolved substances. This method is highly accepted, as it produces high-quality, low-cost drinking water. The systems operate by automatic controls and are highly reliable.

3. Natural Spring Water

Natural spring water is water that flows naturally to the surface of the earth. Natural springs exist throughout the world, ranging in size from five gallons per minute to millions of gallons per minute. If you are considering bottling spring water, look for springs that reveal a sound water analysis. For many markets, the lower the Total Dissolved Solids (TDS) results, the better.

THREE APPROACHES TO THE BOTTLED WATER BUSINESS

Each of these three types of bottling plants has various options as far as equipment is concerned. For our purposes, we will make a distinction between three different approaches in the bottling business:

A. 3 and 5-gallon, large bottle, office and home delivery

This approach is a very fundamental and sound approach to the bottled water business. Profits are derived from bottled water sales, cooler rental, coffee service, cup sales and delivery service. This option allows for high profit margins and less volatile account activity. Essentially, a customer base is established by direct sales or media advertising to sell the service of home or office delivery of bottled water. In most cases, a bottled water cooler is placed into each customer's location, and bi-weekly service calls are made on those customers to replenish depleted supplies of water for continued sales. Typically, a routing system is designed to make deliveries, by truck, to contracted customers within a tight geographic region.

B. 500 ml to 1-gallon retail market

This approach targets retail distribution networks for sales and marketing of smaller packaged water products. Generally, retail outlets such as grocery stores, convenience stores, food chains, gas stations, food marts and other consumer outlet locations are prime areas for distribution of small package bottled water. Typically, pallets or cases of water are supplied to retail outlets for consumer purchasing. Although individual bottle profits may be low, volume sales can produce tremendous revenues in certain areas. A major advantage of the Norland Bottled Water Plant is that it is compact and can be installed in any number of small communities. This greatly helps to reduce shipping costs that would otherwise affect the profitability of small package products and might, in fact, prove the project futile.

C. The best of both worlds: Large and small bottles market

Perhaps the best approach to take (if your finances can afford both) is to produce both large and small bottles of water. With the Norland Bottle Water Plant, you can fill all sizes of bottles. There are several advantages with this approach. First, you are able to capture both retail and delivery opportunities. Second, the production and distribution of small bottles can also help promote your large bottle business. By placing your small bottle line with local convenience or grocery stores, your name reaches a larger market. This can help create an awareness not necessarily associated with large bottles. Finally, in most cases, the production of both types of bottles helps to maximize the use of your equipment. It makes better sense to keep your equipment in full production than to let it sit idle. By approaching these two markets, you'll keep your staff busy and equipment profitable.

EQUIPMENT DESCRIPTION

1. **60 BPH Washer** – Designed to semi-automatically wash, sanitize and rinse up to 60 5-gallon bottles per hour. Can also be used to wash 3-gallon bottles.
2. **60 BPH Filler** – Designed to fill bottles ranging in size from 1 gallon to 5 gallons. Fills at a rate of up to 60 bottles per hour. Manual operation for filling and capping of bottles.
3. **Triton 160** – Designed to automatically wash, sanitize, rinse, fill & cap up to 160 5-gallon bottles per hour. Can also be used for 3-gallon bottles.
4. **Triton 450** – Designed to wash, sanitize, rinse, fill & cap bottles ranging in size from 3 to 5 gallons. Fills at a rate of up to 450 bottles per hour. Automatic fill control and capping system. When paired with the Rack Stacker 600, it can really automate your operation, saving on personnel costs.
5. **Complete Triumph Ultra™ and Triumph Classic™** – Automatic rinser, filler, and capper. Optional: labeler, date coder, and ShrinkPack. This is without a doubt the most complete small package system in the industry today. We are aware of no other manufacturer that can supply the entire range of equipment manufactured by a single source. As a bonus, the Triumph systems function as their own clean room, thus reducing the necessary footprint of your operation.
6. **VC6000, VC3000, VC1500, and VC800 Automatic Distillation Systems** – State-of-the-art vapor compression distillation system. Produces up to 6000 gallons of high-quality distilled water per day. Utilizes “tube-in-shell” heat exchange technology – as opposed to “plate type” heat exchangers – for greatly reduced maintenance and troubleshooting.
7. **Reverse Osmosis Systems** – Alternative method of treating municipal water systems. System sizes range from 500 to 20,000 gallons per day. Totally automatic operation with self-maintaining features.
8. **Ozone Disinfection Systems** – A critical component in the disinfection and stability of your product water. Ozone gas is created by a high electrical charge and is forced into the product water to create an immediate and residual disinfection ability.
9. **Water Softener** – A resin-based water treatment system that removes hardness minerals from feed water that would normally foul the operation of the reverse osmosis system.
10. **Carbon Filter** – A specially designed filter to remove organic matter, chlorine and odor from feed water.
11. **Blow Molding Systems** – Whether you’re looking to produce 3&5 gallon bottles, or between 10 ounce up to 1-liter PET bottles, Norland offers several blow-molder options to produce your own PET bottles at a fraction of the cost of shipping pre-blown bottles.
12. **ShrinkPak Shrink-Wrapping System** – Saving on manufacturing costs is of critical importance when operating a bottling plant. The ShrinkPak™ allows the operator to save on the cost of corrugated cartons by replacing outdated cardboard material with a thin-film plastic wrap around the bottle case.

13. Rack Stacker 600 – Pairs with your Triton 160 or Triton 450 to automatically load your 3&5 Gallon Bottles into your racks.

THE BOTTLING FACILITY

Norland bottling facility needs will differ depending on a variety of requirements. When first evaluating location options, you should keep future expansions in mind. At the same time, however, don't overextend yourself and use up valuable marketing and promotional capital on unnecessary production space.

Instead, look for facilities that have attached office or warehouse space adjacent to each other so that you might be able to expand by simply acquiring the space next to you when the time is right.

A start-up facility can be as small as 1,500 square feet for production, inventory and sales, or up to 5,000 square feet for larger operations. However, if you are just getting started in this industry, it is not necessary to have a large facility, as the equipment is relatively easy to move if you outgrow your location.

In most cases, the bottling equipment will occupy as little as 500 square feet. You should allow enough space for a private office, small showroom with windows for customers to view the plant and equipment, and a space for a receptionist / bookkeeper.

When you make initial plans for your plant, keep in mind that you want customers to feel free to visit your facility at any time. Customers should be encouraged to stop in to inspect your facility. By allowing and encouraging these visits, you're promoting goodwill and trust in your customers by proving that your plant follows appropriate regulations and hygiene standards.

Following are suggestions for typical bottling plant personnel. These are samples of traditional staffing to help you plan your bottling operation.

PERSONNEL

The type of bottled water operation you choose will have little effect on the type of staff you hire. As a general rule, always look for personnel who have had previous experience in the food handling or food processing business. Bottled water should be handled with much care. Operators must keep in mind that water is a food product capable of contamination if handled incorrectly.

The Route Driver

For the 3-and 5-gallon side of the business, you will need to hire delivery personnel to handle the requirements of your customers. Your delivery person will drive a commercial delivery van or truck for hauling water. Special bottle holding racks are available for several types of trucks. These racks make loading much easier by palletizing up to 30 bottles and then fork-lifting them onto the truck bed. At first, you may choose to load bottles by hand until your customer base can justify the cost of bottle racks.

In the bottled water industry, drivers are more than just delivery people. They are the embodiment of your company and its products. Drivers must be able to represent your business by developing personal relationships with each customer.

Your driver should take a few minutes during each stop to engage in conversation with each customer to make sure that your product is of the highest quality. If possible, your driver should inspect the water cooler and clean it if necessary. He should also offer additional tips for uses of your bottled water (coffee, watering plants, tea, soups, water for pets, etc.). Above all, your driver should make sure there is a full bottle of water on the cooler at all times. It's a good idea to look for a driver who has crossover skills such as food delivery experience and also some sales or marketing skills.

Sales Personnel

At first you may choose to head the sales efforts yourself if you feel your skills are more suited for the sales end of the business. Depending on your market and your initial business plan, you may be the only sales person necessary. Salespeople should fill your customers' orders, possess marketing skills and have strong customer service skills.

Your salesperson should have past sales experience dealing with the types of customers to whom you are marketing. If your marketing approach targets local businesses or homeowners, look for salespeople who have sales experience in direct sales, door-to-door sales or telemarketing. On the other hand, if you intend to become a wholesale supplier, look for salespeople who have experience in dealing with potential retail outlets such as grocery stores, convenience stores or multi-location outlets.

It may be a good idea to remember that the best salespeople are energetic, enthusiastic and positive. You might consider offering them a realistic chance to own part of the business after a qualifying period. This will keep their drive strong and encourage them to keep "knocking on doors."

If your business grows rapidly enough, you may eventually need to establish an inside sales force, comprised of experienced telemarketing people who can service retail and wholesale accounts by telephone and make appointments, if needed, for the salespeople. While starting up, you alone may be able to perform all these functions, but rising sales will eventually demand that you employ additional help.

Receptionist / Bookkeeper

When first starting your bottled water business, you may serve yourself best by employing a part-time receptionist/bookkeeper. In most cases, as your business grows, you should consider hiring a full-time assistant once your sales reach an appropriate level.

Your receptionist should be able to handle telephone calls, post statements, keep track of office supplies and answer any customer questions or complaints. When hiring a receptionist, make sure the individual has at least two years experience in these areas; it will make your job much easier to be able to rely on an employee who has experience dealing with several important issues at once.

ROUTE STRATEGIES FOR 3&5-GALLON OPERATIONS

When establishing a routing procedure for your bottled water, it is critical to remember one concept – **Make deliveries as close as possible to one another.** This statement will go a long way toward helping your business become profitable in the shortest possible time.

Indirect Routing

One of the most elementary mistakes an operator can make is to develop a delivery route by the indirect method. This method has little planning or strategy behind it. An operator using this approach makes his deliveries in an unorganized fashion. His delivery locations are widespread and do not reflect an organized pattern. He may deliver 3&5 gallons of water on one end of town, then drive to the opposite end of town to deliver another 5-gallon bottle. This haphazard method is both time-consuming and expensive. Too much time is wasted driving from one remote location to the next. Excessive wear and tear on your delivery vehicle and excessive gasoline expense reduce the profitability of your product.

Direct Routing

This method is by far the most profitable and sensible method to begin with. The direct method is a well-planned, methodical approach to delivery. It is critical when establishing your area that you send your salespeople to one specific part of the community. You should stress to your salespeople the importance of **Close Proximity Routing**. These close proximity customers are often neighbors. Try to establish a route where you can deliver from one house to the next, one apartment to the next or one office to the next. This close proximity will reduce transportation costs, decrease driver time and extend the life of your delivery vehicle.

Grid Approach

Another approach to the delivery of your bottled water is to develop a grid system on your local city map. Divide your map into four or more sections. Number the sections to designate areas of responsibility for drivers and salespeople. Take each numbered section and divide it further into four or more sub-sections and have your salespeople concentrate on each sub-divided segment. The object here is to focus your sales efforts and to condense your delivery schedule.

MARKETING STRATEGIES FOR THE BOTTLED WATER BUSINESS

The type of marketing strategy and approach you use must be tailored according to the type of bottled water business you plan to profit from. For example, if you plan to operate a manufacturing / wholesale business, you should focus your marketing efforts on your target customers, such as individual local water distributors, soft drink distributors, food service distributors and office delivery companies. On the other hand, if you decide that direct retail marketing is your best approach, your marketing efforts will be direct sales to office buildings, restaurants, residential households, government agencies and local businesses.

In order for you to effectively choose what kind of business to start, you must first evaluate what type of market environment exists for both strategies.

MARKET RESEARCH

Market research provides businesses with relevant data to help avoid or solve marketing problems. This information is absolutely essential in the start-up phase. Conducting thorough market surveys is the foundation of any successful business. In fact, strategies such as market segmentation (identifying specific segments within the market) and product differentiation (creating an individual identity for your own brand of water that separates you from all the others) would be impossible to accurately develop without market research.

The market research process can be broken down into specific stages:

1. Market Analysis

A. Target Market (Direct Retail Sales or Manufacturer/Wholesaler)

1. Customer
 - a) Age
 - b) Income
 - c) Education level
 - d) Occupation
2. Location
 - a) Neighborhoods
 - b) Small/medium towns

B. Industry Trends

1. Product/services
2. Price Structure
3. Distribution methods

C. Competition

1. Product/services
2. Quality
3. Customer base

D. Competition Comparison

1. Strengths
2. Weaknesses
3. Price

2. Strategy

A. Positioning Statement

1. Product/service description
2. Price
3. Quality
4. Distribution channels
5. Location

B. Promotion

- 1 Advertising
 - a) Newspaper
 - b) Television
 - c) Radio
 - d) Newsletters
 - e) Direct mail
 - f) Social Media
2. Public Relations
 - a) Promotions
 - b) Sponsorships
 - c) Advertising/promotion budget

HOW TO CONDUCT A MARKETING SURVEY

A thorough market survey will help determine a reasonable sales forecast for your micro bottling plant. Here are some basic steps toward assessing your market and making a forecast.

1. Determine the market limits or trading area of your service. For example, what is a realistic area limit for your distribution capabilities? How far will you have to deliver your product?

2. Study the population within this area to determine its potential spending characteristics.
3. Determine the present sales volume of existing bottled water companies or bottled water importers.
4. Estimate what proportion of the total sales volume you can reasonably obtain.

In conducting your market research, you'll be gathering two types of data. The first will be primary information that you will compile yourself or hire someone to gather. Most information, however, is compiled and organized for you. This secondary information can come from government agencies, trade associations or businesses within your industry. Locate these resources and take advantage of them.

PRIMARY RESEARCH

There are two basic types of information in this category, exploratory and specific. Exploratory research is geared toward defining a problem by questioning target customers. Open-ended and general questions that elicit lengthy answers are required for this type of research.

Specific research concentrates on solving a problem that has already been defined. It involves more in-depth questioning than exploratory research. The objective of specific research is to decide on concrete courses of action that will resolve a problem defined by exploratory research.

SECONDARY RESEARCH

As previously mentioned, most secondary research information will have already been gathered for you and will be fairly easy to obtain at a nominal cost. Secondary research is not as complicated as primary research. It doesn't require any interviews to determine problems and develop courses of action. It only requires knowledge of where to search for agencies that have gathered the information you need.

Secondary Research Examples:

1. **Census facts:** Local, county, state and regional census information which details population density, income and family size Information.
2. **Maps:** Maps of trading areas in counties and states are available from chambers of commerce, industrial development boards, trade development commissions and city newspaper offices. These maps often show where the majority of business is conducted in an area and reflect the population's spending habits.
3. **Media sources:** Ask the sales departments of local newspapers and magazines for copies of editorial business profiles. These may help determine the financial situation of your potential competitors. Advertising representatives of all local media are a good source of information on spending patterns in the community. The research they routinely conduct can help you determine if there is a valid market for your micro bottling facility. Study the Yellow Pages as well to see how many businesses of a similar type are already operating and where they are located.
4. **Community organizations:** Many cities have chambers of commerce or business development departments that encourage new businesses in their communities. They will often supply information regarding population trends, community income characteristics, payrolls, industrial development, etc., free of charge.

5. Industry: In any business, you must identify the extent of industry in your area.

Payrolls create buying power and potential customers. Unless payroll and financial stability are present, investment in the area may be unwise. You should look to set up your bottled water business in a community that has substantial diversified and permanent industry, an upward trend in community payrolls and minimal seasonality.

ADVERTISING AND PROMOTING YOUR BOTTLED WATER BUSINESS

Proper planning before you implement an advertising campaign is crucial. Your first step in advertising is to learn as much as possible about the market you'll be targeting. Consider these questions when doing so:

- Who are my potential customers?
- How many are there?
- Where are they located?
- Where do they now buy the products I want to sell them?
- Can I offer them anything they are not getting now?
- How can I persuade them to do business with me?

Other points to consider:

- What services am I offering?
- What quality merchandise do I sell?
- What kind of image do I want to project?
- How do my plans compare with my future competition?

The advertising process involves these four steps:

1. Set a budget based upon either the cost method or the task method (defined on the following page).
2. Gather information on advertising media rates.
3. Determine where your advertising and promotion dollars will be most effectively spent in order to reach your target market. It is critical to find the best way to reach your prospective customers without wasting money and efforts on nonproductive audiences.
4. Choose a minimal number of crucial points to be emphasized in your advertising. Keep your messages consistent in style and content.

CREATING A BUDGET

How much is enough for an advertising budget? Most companies measure their advertising budget according to a percentage of their projected gross sales; a budget of 2 to 5 percent is considered standard. This is generally referred to as the cost method and theorizes that an advertiser can't afford to spend more money than he has. For instance, if projected gross sales for the year based on your business plan is \$300,000, using the cost method you would budget \$15,000 per year, or \$1,250 per month. For a "Grand Opening," you would budget approximately \$2,500 (or 10%).

Some larger companies base their advertising budget on the amount of money needed to move the product. This is called the "task method." There are many different ways to determine the amount of money needed to move a product, but experience is the best. Companies just starting out, however, won't have past records to guide them and will need to refer to the business plan and market survey.

Also take into account the media that will be appropriate and what the cost will be to effectively advertise using those methods.

PURPOSE OF ADVERTISING

Advertising provides a direct line of communication to both current and prospective customers, enabling you to:

- Convince your audience that you offer value to them
- Promote the image of your brand and your products
- Create demand for your products and your services
- Introduce new products and services
- Support your brand and your message
- Attract new customers to your business

Make your ads effective by making them:

- Simple and easy to understand
- Truthful
- Informative
- Sincere
- Customer-oriented

Good advertising gets favorable attention from the right people, and creates a desire for those people to do business with you. Always use a call-to-action to persuade the prospective customer to try your product.

Consumers may not realize need for a product until they are educated. New businesses and/or products may require extensive pioneer advertising, which may cost more in the beginning. Advertising has a cumulative effect. Response is slow at first, but increases with time. Sporadic advertising is not as effective as consistent advertising.

CHOOSE THE RIGHT MEDIA FOR ADVERTISING

Marketing has changed tremendously over the years. Where we once relied on TV, Radio, and Newspapers, there are far less expensive and broadly distributed methods today.

- Social media
- Trade publications
- Trade associations
- E-Newsletters
- Free samples or custom labels
- Drop-ins
- Partnerships
- Neighborhood coupon books

While choosing the media to work best for you, ask yourself:

- Who's my target market and where will they see my marketing efforts?
- Your objective and goals
- Your advertising coverage – are you doing local delivery, or does your territory expand into other areas?
- Your budget

THE MAIN EVENT

Your grand opening should, indeed, be grand. Consider your space, your guests, and your objectives for the event while planning.

- Offer new customer specials – incentivize them to BUY NOW
- Advertise giveaways and specials
- Send a press release to all area publishers to include print, tv, and radio
- Post the event to your social media pages and ask fans to share – don't forget to create an event on Facebook

COMMUNITY OUTREACH

Strive to be involved in your community. Join your local independent business association, and get elected to a local non-profit board of directors. Create a philanthropy campaign to give away bottled water to less fortunate, create custom labels for a group home, or donate water for a school event. Proudly include your branding and signage, and ask recipients to share your generosity. Consider hosting or sponsoring a community event. Being a friend and partner to your community is nearly free, and will create a fantastic reputation for you and your product.

TYPES OF BOTTLED WATER

There are many different types of bottled water that you may choose to market. The International Bottled Water Association (IBWA) regards each type of water as a “special” product. The definitions for each type of water are:

Artesian Water

Water from a well that taps a confined aquifer in which the water level stands above the water table. *Artesian water* shall meet the requirements of natural water.

Carbonated Water or Sparkling Water

Water containing natural or added carbon dioxide.

Distilled Water

Water that has been vaporized, then condensed, and meets the definition of purified water in the most recent edition of the United States Pharmacopoeia

Drinking Water

Water obtained from an approved source that has, at minimum, undergone treatment consisting of filtration (activated carbon or particulate) and ozonation or an equivalent disinfection process.

Fluoridated Water

Water injected with fluoride. The label shall specify whether the fluoride is naturally occurring or added. Any water that meets the definition of this paragraph shall contain not less than 0.8 milligrams per liter fluoride ion and otherwise comply with U.S. Food and Drug Administration quality standards.

Mineral Water

Water coming from an approved source tapped at one or more borehole natural springs, originating from a geologically and physically protected underground water source. *Mineral water* shall be clearly distinguishable from other types of water by its specific contents of minerals and trace elements, which in the original state at the point of emergence remain constant. The total dissolved solids (TDS) of natural *mineral water* shall appear on the label of the bottle and be stated in milligrams per liter.

Natural Water

Bottled spring, mineral, artesian or well water that is derived from an underground formation and is not derived from a municipal system or public water supply.

Purified Water

Bottled water produced by distillation, deionization, reverse osmosis or other suitable processes, and that meets the definition of purified water in the most recent edition of the United States Pharmacopoeia.

Spring Water

Water derived from an underground formation, from which water flows naturally to the surface of the earth. *Spring water* shall meet the requirements of natural water.

Well Water

Water derived from a hole bored, drilled or otherwise constructed in the ground, which taps the water of an aquifer. *Well water* shall meet the requirements of natural water.

PLACING BOTTLED WATER COOLERS

INTRODUCTION

Water quality is a hot topic in nearly every household today. It's on the TV news, on the radio and in magazines and newspapers almost daily. People are taking action to improve the quality of their water by purchasing bottled water and by investing in water treatment or filtration equipment.

A large segment of the population does not want to go to the expense of having a home water treatment system. Some who could afford the expense do not want to be bothered with filter changes and maintenance.

Other homeowners plan to stay where they are for only a few years, so they do not see the point in installing a permanent system. A bottle cooler and water delivery service is the ideal solution for all these people. There is also benefit derived from being able to show visitors to their home that they have bottled water. Many bottled water companies say customers report it's an "affordable luxury." How can you beat the convenience of having someone deliver your water for you?

You have a similar situation in the commercial setting. Where businesses have kitchens or water fountains, they rarely have efficient filter treatment systems. Not many businesses are willing to make such major improvements in their space, especially if it has been leased. If they do have water treatment systems, they often do not change cartridges often enough to really improve the taste of the water.

A bottle cooler is one of the few investments a company can make that will reap many times its worth in benefits. Coolers are convenient to use. In general, the more water people drink, the healthier they are. That could mean less sick time and better production at work. A cup of good water helps a person stay fresh and clear-headed so they can do their job well. A bottle cooler is a visible perk that employees can appreciate every day. Knowing your company gives good perks can make the difference between just showing up *at* work and showing up *to* work.

Where companies brew coffee for their employees, bottled water can save money because it takes 1/4 to 1/2 ounce less coffee to brew a pot than with tap water. This can really be significant if a company is brewing a lot of coffee. No lime scale build-up in the machine makes it easier for the person who has to clean it. If you are trying to set up a small business as a new customer, you may very well be selling to the person who cleans the pot. Who doesn't want their life to be a little easier?

Turning those opportunities into customers is what this manual is all about. Placing bottled water coolers is a relatively easy thing to do once you figure out how to do it.

PROSPECTING METHODS

The key to attracting a larger number of customers to your service is to make it as easy and simple as possible to enjoy your service. The less paperwork required, the faster you will place coolers.



Most successful bottled water companies offer a free-trial period to interested persons. Many of these companies have found that a two-week trial period is an ideal length of time. This period provides the prospect ample time to get thoroughly acquainted with the taste and benefits from using bottled water.

Encourage your prospects to use the water not only for drinking, but for cooking, reconstituting frozen juices, making soups, coffee, tea and ice cubes—and don't forget to suggest they provide this water for their pets.

Free trials are important not only because if you are good you will close 50-90% or better of the people who try your service, but also they are very important for exposure. The more of your coolers people see, the more they think you are a household name, and the more likely they will call you for their own water service. Very often, employees of a company that has a free trial will pick up your card or your coupon and get a cooler for their home.

The free-trial method is discussed in greater detail later in this manual. Converting free-trial prospects to paying customers is also discussed.

Here are the major ways we use to attract new customers to our bottled water operations. If you do a cost-per-customer analysis, we believe a free trial system is the cost-effective way to get customers.

CANVASSING

Door-to-door canvassing is the bread and butter of most successful bottled water businesses, as you are able to cover the most ground and

generate the most sales. This method of generating business can be used in different ways. By targeting your canvassing to specific areas or types of businesses and residences, you can manage the growth of your routes to make deliveries as easy and cost-efficient as possible.

We believe canvassing is the best method for getting your service in the hands and mouths of the most people. We'll discuss canvassing in greater detail later.

REFERRALS

Obtaining referrals is a very important way of prospecting for bottled water customers. Anyone who visits a friend who has a cooler is almost always a prospect. Oftentimes, current customers are some of the best salespeople you can have for your service. They have experienced the benefits of your service and have developed positive feelings about the quality of the water and your service. These people can easily transfer

their positive feelings to their friends, family and co-workers.

Most salespeople, including those in the bottled water business, do not work hard enough on obtaining referrals. It's not because referrals are not a good source of new customers— it's just the opposite. It takes additional effort to obtain referrals, and too many people do not want to make extra effort today.

Most successful water companies give free water to current customers as a way of saying thanks for sending referrals. Use this free water to your advantage. Always tell folks “how to get free water” and ask for names and phone numbers.

Calling on the neighbors of accounts is a natural way to expand your business in a logical and efficient manner. Ring the bell at the front door, and when someone answers, say something like, “We serve your neighbor, Mr. Jones, so I thought I'd bring you some free water to try, too. Mr. Jones likes our service, you should ask him.” You can then tell Mr. Jones which neighbors took a free trial and ask him to help us make these people new customers. When the neighbors sign up, give Mr. Jones free water and ask for names and phone numbers of other folks he knows who don't get water from you yet. Using referrals and canvassing properly, you can get an entire neighborhood on your service.

RAFFLE BOXES

Raffle boxes can be a successful way to prospect. This involves setting up a cooler next to the raffle box so people can sample the water. You purchase a gift certificate from the business and raffle it off. Whether you buy a \$25 or \$100 certificate will depend on the amount of traffic, type of business and your budget. Either way, it gives

customers of this business a way to get some free merchandise. On your drawing entry, have a spot where people can check off to receive a free trial of your water. Call all of the interested people who check the box. Do some pre-qualification on the phone, then go set up the free trial.

DISPLAY BOOTHS

Display booths at shows and fairs can be an excellent way to generate prospects. Visiting with folks who come to your booth for a drink builds good public rapport and gives you a chance to make sure everyone enters the drawing. It is also a good way to get feedback from the public on your service. Visiting with other exhibitors is a great way to prospect for new commercial accounts and to get referrals from exhibitors who are already customers.

Malls, shopping centers and grocery stores will often let you set up a booth and do a mini-show on a weekend in which you are the sole exhibitor. This, too, can be very effective in filling the lead box.

FREE WATER GIVEAWAYS

Consider giving away lots of free water at running road races, fun runs, bicycle races, walkathons, ground fundraising walks—anywhere there will be lots of people thirsty for a good cup of water. The pros call this “event marketing.” And it works.

Put your water at any of the “aid stations” where water is handed out. Many Norland customers report that this type of exposure has proven to be extremely valuable in growing their local markets. Consistency is the key to success. After you've provided this free service for several such events, your company name will become well known to participants

and sponsors alike. When they become interested in adding a cooler to their business or home, they'll naturally think of you.

BOTTLE DROPPING

Bottle dropping can be very effective, especially if you also retail smaller bottles through retail outlets. This process involves delivering single 16 oz. or 500 ml bottles to homes and/or businesses in a given area.



Decide how many bottles your budget will **ALLOW YOU TO GIVE AWAY!** Choose a neighborhood or a business park in which you already have a few customers and leave the bottles at the front door of homes or with the receptionist at offices. Make sure you have an accurate list of who received a bottle at offices. Leave a free trial offer for your service with the bottles. If you are leaving bottles outdoors at homes, it is best to leave the bottles in the evening and put them in the shade. You will hurt your effort if the bottles are fouled by sunshine. No one wants plastic-tasting water.

Wait two days, then contact everyone who has received a bottle. **IMPORTANT**— do not expect the prospect to call you back. You must call them.

You can use a street index and phone each home if you'd like. Being there in

person is best. Knock on the door; ask if they'd like the free trial now; and set them up. Say something like, "We've brought you your free bottle cooler to try." Or, if the person looks at you with confusion in their face when they see you at the door, ask, "Did you get the free water I left you the other day?" Based on the answer to these questions, you either have a free trial to set, have a few questions and objections to deal with, or have a person who is definitely not a prospect.

Bottle dropping can be very effective, especially if you also retail smaller bottles through outlets where your water is easily accessible, such as the grocery store, convenience store, etc. Even if they don't become a route customer, they will be inclined to buy your water the next time they are in a hurry and need bottles from the store.

Some companies shy away from bottle dropping because it can be expensive if every route driver and sales person puts out a dozen bottles every couple of days. We like it because it is easy to track response; great for filling in routes; and far less expensive than television advertising. If you are just starting out in business, you can't wait for the phone to ring. You need to be out helping people decide if they are going to become a customer now or not.

If you are going to bottle drop, make sure your follow-up is thorough. Do not wait more than two days to go back to make your presentation. If no one is home, put them on a list of people to call on the phone or go back the next day. If you want the whole neighborhood taking bottles on your route, you must be persistent.

Go back to areas where you bottle drop and ask for referrals two to six months after adding the new customers you got through the bottle drop. Each time you work through the neighborhood, you will get a few more route customers.

When following up on bottle drops to businesses, just walk in with a couple of bottles and ask where the free cooler is supposed to go. Sometimes it is unnecessary to bottle drop businesses. If your competition is already in an area you want to dominate, however, bottle dropping is a good way to open doors.

CALL-IN LEADS

Call-in leads are an excellent source of

Some companies pass call-in leads on to the sales reps. Other companies may work the leads with telephone crews. Whether you go out to see prospects after some phone pre-qualifications or try to write the business on the phone, you do pretty much the same thing: give buying choices.

When you work a call-in, ask how they found out about your company, because that may determine what you do next. Tell them briefly about pricing, delivery and lease terms and ask, “Would that work for you?” Then ask if they’d like a free trial or if you can go ahead and just add them to the route. Either way is fine. Go set them up and ask for referrals.



new customers. If you qualify them well, many will become customers on your first visit with them. Many of these customers will also provide good referrals. It takes a solid advertising budget, advertising consistency and an established market presence to get the phones to ring steadily. This is fine for an established bottled water business, but if you are just starting in the business, please do not expect to grow rapidly relying on your advertising only.

With the increasing concern over the quality of our drinking water, you should have no problem adding new accounts as long as you can keep a steady stream of new prospects flowing. Using all of these techniques will keep you busy writing orders. Just be careful that you do some pre-qualifying with all leads and referrals. You want to make sure you don’t waste time setting a free trial with someone who doesn’t have the money to pay the water bill.

SELLING

Let's talk a little about selling in general. Perhaps you have had formal sales training, have read the famous books on the subject, or have a lot of experience in the field. In any case, here are some basics that may help you.

You are indeed fortunate to be selling a product that is actually good for people. Folks may drink our water because they are thirsty, but every sip does help them become healthier. Doctors and other health professionals tell us that we should drink 8 to 10 glasses of water per day for optimum health. Surveys have shown that far too many of us don't drink nearly enough water.

SELLING IS A NUMBERS GAME

Not everyone you speak to may be interested in enjoying your bottled water service at that particular time. Not everyone will see the immediate benefit, not everyone will be able to afford the service, and some may already have a competitor's service. The number of calls you will have to make to set one cooler will vary depending upon your area, the time of year and a host of other variables, such as the taste of the tap water in your area.

When someone refuses your service, you should not be pushy. Your prospects must never see you as obnoxious, but rather as thorough and professional. You have to bob and weave your way into an order, not bum-rush into one.

You must be patient. And you must stay in control of your "game." Be patient while you wait for the numbers to run. Making the 100th call with the same clearness and enthusiasm as the first call of the day is not easy.

You must maintain patience while you are making a sales presentation. You may know there is a perfect spot for the cooler. You might know that the people will enjoy the service. Yet, you must not lose your head, answer questions calmly and help guide the negotiations. You might have to stand back and watch office politics at work while competing personalities use your bottle cooler as a political device to gain leverage and control. You have to do this without pushing too hard. Only patience will get you through.

Set goals for the number of people you want to contact for the day. By the end of the day, your sales calls should be a total blur. The only ones you should really remember are the ones where you took an order and the ones you know you should contact later. The rest are unimportant. Count how many calls you made to get a feel for your percentages. How many calls does it take for you to get an order? How many does it take to get a free trial? This is important to you can know how to plan your selling time and to know how many coolers to bring with you when you go out each day.

Be the right person. Be nice. Be personable. Be thorough. The old statement says that people buy from those they like, trust and respect. Be someone likable, trustworthy and respectable. The best salespeople enjoy the interactions they have with prospects, meeting new people and seeing different kinds of businesses. Treat everyone like they are someone special. They are, because they will be helping you make a living.

Make sure you cover all the bases. Let people know about the worst feature of your service and prepare them for all the good and bad eventualities. Tell people the bottles are a little heavy, for example,

but you get used to putting them on the cooler after just a couple times. Explain what to expect with billing and delivery—not that you do this right off the bat. Wait until they have agreed to a free trial or to start on the route. Your treatment of a new customer and your “education” of a new customer will keep that customer for the long-term. People like any excuse to quit something. Do not give them that excuse.

Be energetic in your presentations. Do something different. Do something unexpected. Do something right. Walk into a prospect’s office with a bottle on your shoulder and say, “I’ve got some free water for you!” This eliminates all the easy brush-offs people try with salespeople: “Not interested.” “Don’t need any.” “Not today.” Similar ways of saying “No”, just don’t happen when you do something different and unexpected. Briefly tell how a free trial works and say, “I just need someplace to plug it in.” Nine out of ten times, the next reaction the prospect has is to search for an open outlet or to ask a superior where they should put the water cooler.

If you are talking to someone you know you can kid with and they ask how much the service costs, you may consider saying, “About a thousand dollars a month.” After they react, you can say, “Would you take two or three at that price?” It certainly makes \$17 or \$27 a month sound like a minuscule sum. That’s good, because the money you will save people in soda pop, coffee and store-bought drinks will usually more than offset the cost of the service. Make people understand that without being boring.

If you know you can joke with the prospect and they ask how long the free trial is, you may consider responding by

saying, “10 minutes.” It’s good to let prospects know they can be personal with you. It makes it that much easier to deal with the details later. Later in the negotiations, many customers will make demands that you cannot or should not accept; like no bottle deposits, cut-rate pricing or strange delivery times. You have to be able to say, “No way,” to a customer without offending them or throwing the sales process off-track.

Create opportunity for your prospects. If your prospect feels as if you are bringing them an opportunity for a better and more profitable life, they will do business with you. Many people are aware that they should drink more water for their health. But the water at their home or office may not be pleasant to drink. Many office managers are looking for inexpensive perks that will make the employees more satisfied and productive. Find out what your prospect considers an opportunity for improvement and offer it to them.

Pay attention to your prospects. They will show and tell their needs, desires and concerns. Do some constructive chitchat. Let the people tell you what is on their mind as far as water is concerned. Many sales types make the mistake of giving a presentation start to finish no matter what. It is far more effective and considerate to let your prospect do the talking. All you have to do is argue with them while they are selling you on the idea of them becoming a bottled water customer. Answer questions without getting wordy, and ask to leave the cooler.

Objections are only resistance. Not too many people want to be sold without at least a little fight. Let them raise objections. Then act one of two ways. If it is a silly objection, act as if it is so silly that you have heard it for the first time.

A prospect does not want to be the only person who doesn't sign up for a silly reason that no one else even thought of.

Or, act as if every satisfied customer had the same initial hesitance until they took the service. Now they love it. Prospects will do (on the whole) what other people do in the same situation. If the majority of your customers who have an employee break room put the cooler there, then your new prospect should do the same. If you are trying to sign up a dentist, tell the dentist how other dentists use their water coolers.

Close early and often. This is almost a cliché now, but it holds true. The longer you stand around yakking with someone, the better the chances are that you will not get the order. Ask for the order. Ask why you didn't get it. Ask for it again. It may not happen in such straightforward language. Your prospect may say, "We don't have room for it." You say, "That spot over there would work if we scooted the coffee machine over about six inches. Can we do that?" Your prospect says, "No, I don't want it there." You respond, "What about behind the door, there. There is an outlet back there, and you'd still be able to close the door and open it with no trouble."

Pretty soon, your prospect is going to have to find space for the cooler or say, "No, we don't want it." Then you can either offer a free trial or just ask, "Why?"

Make sure your follow-up is correct. Do what you say you will. Follow through, follow up and follow up again. If you say you will bring a cup dispenser tomorrow, do it. Any minor mess-up in follow-through is enough to make a prospect unsure of the quality of your service and your honesty. That is enough

to turn a new customer into a quit customer or into a customer for your competition.

Have fun while you sell. If you have fun, take it light and enjoy the interactions with your prospects. Your prospects will have fun too. One of the reasons people buy is because it is fun to haggle and negotiate and then make a purchase.

Don't take anything personally. Turn any negatives into a positive. Many times, frustrated people like to vent on salespeople. Some folks like to play with a salesperson, stringing them along just to throw rejection in their face. It is not meant personally. These people would vent on or toy with anyone. It is not you. You just happened to be there that day. Sometimes these same people will do business with you if you diffuse their tactic and ask some closing questions. If you can't sell to them, you certainly can forget them as soon as you break eye contact with them.

Turn negatives into positives by getting referrals from people who refuse your service. Sign up someone in the office for a home unit if the boss says "No" to a cooler for the office. Turn your back to the people who just rejected you and look for the next prospect.

Examine each call for a second after you have made it. What went well? What did not go so well? What can be learned? Can that last call be salvaged and turned into an order anyway? Do not harp on your mistakes or bask in your successes, because the next sales call will present its own challenges. Just make a mental note of what you learned so you know better what to do next time.

This examination can show you some little hints that will help your numbers. You may also make a major breakthrough. A Norland customer, out of desperation to make a sale one day, asked a pharmacist what folks do when they want to take a pill in the pharmacy—where’s the good water? The customer said, “He was quiet for about ten seconds,” the customer said, then replied, “Yeah, a bottle water cooler would be good for that; set it up over there.”

Create the right attitude for your success. Many researchers talk about the importance of “programming” your emotions and thoughts. Train yourself with these phrases. “I am a good salesperson.” “I sell a good service.” “I make a good living.” Of course, you must be honest to yourself when you say this. If not, you are wasting your time.

Repeat these phrases often during the day. Use them for encouragement when a sale falls through. Or use them as a pat on the back when you make a sale. Let’s look at how to work each of these types of prospects. Many of the same things apply to any prospect; however, each needs to be considered separately.

In general, you will have an introduction, you will tell the bottled water story of your company, you close the sale, and then you educate the new customer about your company’s routine. At the end, you ask for referrals.

When canvassing, you have to have a strong introduction because you are breaking into someone’s routine to sell a service they may never have considered.

Every business is bothered by sales calls all day long. Home owners are hounded by mail, phone and personal soliciting. You must separate yourself from all of the others. You cannot be seen as a salesperson or you will not get accounts that you could. If, on the other hand, they see you as the waterman or the water lady, then you have an edge.

You must walk-in like you own the place – like these people are already your customer. Select the person you will approach and try some of these openings:

1. “I’ve got some free water for you.”
2. “Who do I see about leaving a free cooler?”
3. “You already get your water from us, don’t you?”
4. “Do you have a bottle cooler already?”
5. “My boss sent me over with a free water cooler for you.”
6. “I’ve got your water for you.”
7. “We’re giving away free trials on our water service today. Where should I put your cooler?”

The opening is to break the ice, pique interest in what you are doing and create

some desire in the prospect. You notice that I rely a lot on the free trial. It is the best method for getting your service in the hands and mouths of the most people. It takes a lot of inventory to put a lot of free trials. That means a

lot of “No-keeps” to clean up and prepare for the next trial. It means giving away a lot of water. If you did a cost per customer analysis, chances are you’ll find



the free trial system to be the most cost-effective way to get customers.

When you open your sales call, people will wonder about the free part. They'll want to know the catch. Usually, the response you get from one of these openings amounts to "Huh?" or "Free water?"

At that point, make your offer. "I'll leave you a free cooler to use for a couple of weeks and two weeks free jugs of water so you can try us out. All I need is somewhere to plug it in." At this point, you either go to dealing with objections, answering questions or looking for a good spot for the cooler.

The bottom line on any answers you give to objections or questions is that the prospect has nothing to lose. On the one hand, the worst that could happen is that they like the cooler, keep the water service and end up with another monthly bill. On the other hand, the worst that could happen is that they drink up all the water and you have to come back to pick up the cooler and the empty bottles. Tell them this! They will say, "Okay, we'll give it a try."

During the time when your prospect is unsure of what to do, after you have made the offer and before they say, "Okay," you may have to help them make a few decisions. Ask, "Would you like it out front in the reception area, or would it be better in the back?" Some businesses get a lot of kids coming through. You need to keep the cooler away from the kids because they naturally will play with it, spill and have water fights – all of which will give your prospect a bad experience with your service. You want them to have a good experience.

Some businesses like the cooler in the reception area so their clients can get a refreshing drink. Other businesses do not want their clients drinking the water because it would mean too much water consumption. Help your prospect make this decision now before something happens to jeopardize closing the free trial offer.

Ask, "Would you like it in your break room, or is there a better spot for it? Do you want it near your coffee machine? It makes really good coffee, you know." The cooler needs to be located so employees can enjoy it and lobby their bosses to keep the service. Many times, the improvement in the taste of the coffee will be enough to close the free trial. Sometimes the additional water consumption used to make coffee will be too much for the budget and cause you to lose a sale.

You'll have to deal with the space issue right away. Many people who are unfamiliar with water service think the cooler is huge. Take them to a spot where the cooler would fit and show them how little room it actually takes up so they can find a spot with which they are happy.

Electric outlet availability is always a problem. Very few offices have enough electrical outlets. You may have to help your prospect rearrange the office to fit the cooler. Always have adapters and 4-in-1 plugs available. You want to get the free trial set, no matter what.

Sometimes people will tell you that they don't drink water or won't use the cooler. Usually if you tell them how much money they would save during the free trial if they used your water instead of buying soft drinks, they will say, "Go ahead and put it in."

In general, it is far more effective to set your own coolers because people don't cool off between saying yes and getting their first drink. If your company policy demands that someone else sets the cooler, do your paperwork and get out. Make sure to call the day after the trial gets set to check on it. This is time-consuming, but essential in nipping problems in the bud.

If you set your own coolers, as soon as you possibly can during the sales call say, "It'll take me just a few minutes to set it up. I'll be right back." While you are setting up the cooler, tell the story of your company. Get the person you are dealing with or a superior and say, "I just need to show someone how this works. Can I borrow you for a minute?" Show them how the bottles go on, how to dump the drip catcher, the difference in the spigots, and the location of the thermostat. If they ask, tell them how you process the water. Tell them if they keep the service, you will check on them as your delivery schedule shows. Have them help you by dumping the drip tray after you bleed the lines.

You will then need to cover the paperwork required. You may say, "I just need to do a little paperwork with you." Walk them through the rates, lease terms, get all the information you need, and leave them with your business cards and their copy of the paperwork. Provide them a few free trial coupons and tell them how they can get free water by giving you referrals.

When you are sure everything is set up, the paperwork is complete, and the customer has no more questions, grab a cup, take a sip of water and say, "You're all set. I'll see you in a couple of weeks.

If you need me in the meantime, call me." And take off for the next free trial.

Taking a sip off the cooler is an important thing to do. It gives the customer confidence and lets them know you love what you sell.

Before you leave, take a look at the floor in front of the cooler to make sure you didn't give them a leaker. If you catch a leaker right away, you still have a good chance at the sale. If you miss a leaker and they get five gallons of water on the floor, you will look like a jerk and will have to sing and dance and maybe even run the Wet-Vac to save that sale.

There is nothing wrong with trying to close the sale right away. If the prospect is very receptive or tells you they've been thinking of getting a cooler, try it. If you are talking to a decision-maker, that is even better. You can say something like, "If you're pretty sure you'd like to go ahead and keep the service, I can offer you a better deal than a free trial if I can add you to the route today." Offer whatever your company will let you. First-month-free is pretty standard fare. Four weeks is better than two. Maybe offer a third free bottle. It may allow you to close the sale immediately. Go ahead and ask, if you think it is appropriate.

Sometimes when the boss is not in, employees may try to block your effort by saying, "The boss is not in. I can't say yes or no." Tell them it's free, no obligations, no cost, etc. How can they get in trouble? The worst that can happen is that you have to come get the cooler later. Usually, two employees will look at each other and say, "Well, if it's free, I guess it would be okay." Presto! You've got another free trial.

On occasion, someone will tell you to leave a trial even if they have no intention whatsoever of keeping it. Here you need to make a judgment call. Will enough people see and use the cooler to make it worth your while? Is there a chance they may keep it even if they say they won't?

Cultivating referrals is what selling is all about. Someone who may have been thinking about getting a cooler for home or office may take a sip from one of your coolers somewhere and say, "How do I get one of these?" Presto! Instant customer.

At some point during the free trial presentation and the free trial close you will want to mention, "Did I tell you how to get free water?" Naturally, this question generates some interest. Then explain the referral process. Most companies give two free bottles for a referral. Smart customers can get almost all their water for free.

When you set up a home account, ask about relatives, friends, neighbors and co-workers. The smart salesperson canvasses the neighbors on both sides of the new residential customer

When you set up a commercial account, tell the boss, the supervisor, the bill payer or whoever is within earshot that the company will get two free bottles for any referrals.

Of course, some folks don't care about free water. Some folks don't like introducing people to new concepts or services. But if you make everyone aware that you are aggressively seeking referrals, all your customers will send someone your way if they are asked about water.

Leave "Free Water" coupons with every new customer, which they can pass along to anyone who is interested in a free trial. You should be able to get from 10% to 40% of your business from referrals. People who don't like to canvass as much as others can get even a larger slice of their pie from referrals if they work at it.

THE POWER OF FREE TRIALS AND REFERRALS

When approaching someone whose name you've gotten from a customer, do it exactly the same as your canvassing work except for the introduction. Call people first on the phone to set up an appointment, unless it is an immediate neighbor or a business. You may want to say something like, "I'm Bruce from Super-Dooper Water. Mr. Jones gave me your number and said you might like to try our water service." At this point, there is usually a question on pricing, source of the water and measurement of the cooler. As soon as possible say, "I could bring your cooler over later today or tomorrow. Which would be better?" The alternate choice close is always a good tool.

Keep the phone conversation as brief as possible. After a short introduction you can say, "You can do this two ways, you can take a cooler and water for a free trial just to test drive it, or I can go ahead and add you to the route, in which case we'll give you a month's free rental and two free bottles to help you get started." If your company requires up-front money, deposits or security, tell them to have a check ready in case they want to go with the free month.

When you arrive at the person's house or place of business, show up with a bottle or two, introduce yourself and ask, "Where were you thinking of setting up your cooler?" Get down to business right

away. Set the bottles down, help them decide on a spot, go get the cooler and tell the story while you get set up. Then ask, "Do you want to take this on a free trial, or do you want me to go ahead and add you to the route today? Either way, I am happy and appreciative." Have them approve the paperwork, collect the money if they are ready to start, and head off to the next one. Naturally tell them about how they can get free water by giving someone else as a referral.

When you work referral sales calls, work as if you were cold-calling, except mention the neighbor who uses your service. Whenever possible, enlist this neighbor to help close the free trial by making some contact with your new prospect.

When contacting people who have checked the free trial box on a drawing entry, whether it is from an in-store lead box or from a mall show or trade fair, handle them the same as a referral except for your introduction. "Hello, I'm Bruce from Wet-and-Clear Bottled Water. You requested a free trial of our bottled water service, so I am giving you a call to see when we can get together." Or, "...so I can set a time to bring it by for you."; or, "...did you want me to bring that by sometime today or tomorrow?" They will surely have some reaction, which will indicate how interested they really are in being your customer.

If a kid in the household filled out the entry, the parents will either be apologetic or annoyed. Reassure them that kids fill out entries quite often and it's no problem. Tell them you would be pleased to bring them a free trial anyway for the entire family to enjoy. Many times, you will turn an annoyed parent into a satisfied bottled water customer. Sometimes the parents will agree to a free

trial just to satisfy their kids' curiosity. Whatever the reason they accept the free trial, the odds should be at least 50/50 that they will keep it. And if they don't keep it, a friend or relative will see it and call you for their own cooler.

Call-ins are always the easiest to handle, because you already know if you are setting up a free trial or a new customer. The folks have a check waiting for you. You can cover all the aspects of your service, explain about referrals, and be in and out of their home or office in ten minutes. If you are smart, you will go into referral mode right away and ring the neighbors' bells.

Bumping competitors is not always very easy unless you have a distinct taste advantage over your competition. Sometimes placing your cooler next to your competitors for a side-by-side taste-test is effective.

Price can win a customer from the other guy. Although pricing wars are not good for anyone, you can sometimes win over a customer with a few dollars savings a month or perks such as four free bottles.

Many customers are as used to their route driver as they are to their mail carrier. They wouldn't switch companies because they like the route driver. This is very important to appreciate, because this cuts both ways. Your route driver has the opportunity to be a significant person in your customers' lives, making you less vulnerable to the competition. If, however, you approach one of the competitor's customers the day after the route driver messed up and missed the stop, dumped too much water or otherwise goofed, you have a shot at winning over this account.

The best way to beat the competition is to get to the prospects first, add them to your route and take good care of them.

It won't be long until even the people who said their water was good enough for their daddy and their daddy's daddy will be wanting bottled water or bottled quality water in their homes. Make sure they think of you when they decide to call. If you are working all these prospecting methods every day, they will think you are the only water company in town, even if you are one of the smaller companies.

CLOSING THE FREE TRIAL

You should have answered all your prospect's questions, dealt with any objections and pre-qualified them during the set-up of the trial. Make some note on your forms about each particular prospect's hot button. Did they try the cooler to make baby formula? Did they try it because the water where they live tastes like mud? Did they take a free trial to convince their spouse about something of which they were already convinced? Use that in your close. Call on the phone and say, "Hi, it's Bruce from Down-right Delicious Water. How'd your wife like the taste of that free water I left you?" If they decided not to keep the service, they will let you know, and you can go get the cooler.

If you have no particular hot buttons to push, use one of these questions.

- "How's that cooler working out for you?"
- "Are you enjoying your free water?"
- "Are you needing some more water yet?"

- "What do you think of the water?"

Usually people will tell you they like the water and the cooler works fine. If they haven't said "No" in some way after the first question, you might say:

- "Did you want me to add you to the route, then?"
- "So you think you want to keep it?"
- "Should I bring the delivery schedule by for you?"
- "Is there any reason that you shouldn't keep the service?"
- "Did you want to keep the cold cooler, or should I bring you a Hot-n-Cold?"

Any questions of this nature will do the job. Set up a time to go by and get their approval on the paperwork and pick up the deposits. When you get there, explain the route system. Tell them that if the driver doesn't see any empties where they are supposed to be, he will just go on to the next stop.

Finish the paperwork with them. Make sure they understand the lease terms and early-quit penalties. Get money from them. Get a few referrals from them; that's it – you're on your way. It shouldn't take more than five or ten minutes to close the trial.

If the prospect says no to keeping the service, you may want to ask if there was something you didn't explain, or if you did something wrong. That will bring out the true problem, which is either no money to pay the water bill, or they are so used to tap water that they can't stand

the good stuff. Sometimes people just refuse to drink water, even though every doctor out there says, “Drink water!” If people were not convinced when you originally told them that the cooler will pay for itself in decreased soda pop consumption, you probably can’t convince them of that later.

If they are not going to be able to handle an additional \$20 or \$30 a month, they will just end up being on your no-pay list and nothing but trouble, so it’s better to pick up the cooler. If they are not going to use the water, there isn’t much point of having them as a stop either, so check back with them in six months to see if they’ve changed their mind. Ask, “Are you sure you want me to take it away?” before you leave – just in case.

The quicker you can pick up the no-keeps, the sooner they can be cleaned up and ready for the next free trial.

Remember the rule of numbers. If you average a 50% keep rate, each “No” means a “Yes” will follow. Each “Yes” should be worth a referral or two. This is how orders start to build so that, in time, you have difficulty keeping up with the orders.

In order to keep up, never make definite appointments with people. Leave a window – from 8 a.m. to 10 a.m. or Noon to 1 p.m. – and be realistic. People go nuts when someone says they are coming at 4:30, and they don’t show up until 5:00. So, set it up so you will be a good guy. Leave yourself plenty of room to be on time.

PREVENTING NO-PAYS

No-pays and late-pays are the worst things a company has to deal with. Help prevent them by telling new customers that your drivers are not allowed to

deliver water to any account that is more than 30 days late. Remind people not to put the water bill to the side and forget it. Make yourself available to call accounts that are getting behind. Sometimes all an account needs is to hear from the person who originally set them up. When you call, be concerned that they might get their water cut off. You wouldn’t want that to happen, so prevent it.

Bottled Water System Operations Manual

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Good Manufacturing Practices

Virtually every industry has rules and regulations that must be adhered to. Some of the regulations are federal, while others are state and local. The bottled water industry is no different.

Bottled water, like all food products (except meat and poultry products) is fully regulated in the U.S. by the U.S. Food and Drug Administration (FDA). In addition to FDA's general food requirements, bottled water is one of only several food product categories that has additional extensive and specific FDA requirements that must be met. These federal requirements include:

- Food adulteration and misbranding
- FDA's general food Good Manufacturing Practices (GMP)
- FDA's standard of quality for bottled water and standard of identity

General Food GMPs

The general GMP application to foods, including bottled water, govern:

1. Plant and ground maintenance, including drainage and waste control;
2. Plant design and construction;
3. Sanitary maintenance of buildings and fixtures;
4. Sanitary facilities including water supply, plumbing, sewage disposal, etc.;
5. Design and maintenance of equipment;
6. Production and process controls of raw materials and manufacturing operations, including sanitation and quality control of receiving, inspecting, transporting, segregating, preparing, manufacturing, packaging and storage of water; and
7. Defect action levels.

Bottled Water GMPs

The GMPs specific to bottled water processing and bottling contain rules governing:

1. Plant design and construction, including separation of the bottling room, protection of processing operations, adequate ventilation, and enclosure of washing and sanitizing operations.
2. Sanitary facilities, including:
 - Approved sources of both product water and operations water;
 - Minimum once-a-year analysis of source water for chemical contaminants;
 - Analysis once every four years of source water for radiological contaminants;
 - Once-a-week sampling and analysis of source water for microbiological contaminants;
 - Use of approved test and sample methods;
 - Control of air under pressure; and
 - Separation and maintenance of locker and lunchroom areas.
3. Sanitary operations, including:
 - Adequate sanitation of all product water-contact surfaces;
 - Adequate drainage and protection from contamination of multi-service containers, utensils, disassembled piping and equipment;
 - Protection of single-service containers, caps and seals;
 - Sanitary filling, capping, closing, sealing and packaging of containers.
4. Equipment design and construction, including materials of construction.

5. Production and process controls specific to the production and processing of bottled drinking water, including:
 - Sampling and inspection of containers and closures;
 - Product and sample analysis;
 - Bacteriological analysis once a week of each type of water produced during a day's production;
 - Chemical, physical and radiological analysis at least annually of a representative sample from a batch or segment of a continuous production run of each type of water produced during the day's production.

6. Record-keeping
 - Maintenance and retention of records of product sample analysis;
 - Maintenance and retention of source approvals;
 - Maintenance and retention of other GMP records;
 - Availability of required records for official review.

Note: Failure to comply with these requirements may render the bottled water product adulterated and subject to regulatory action.

Bottled Water Standard of Quality

As a bottled water manufacturer, you are required to ensure your products meet a federally mandated standard of quality. This standard of quality contains a wide array of acceptable levels of substances in bottled water. This regulation includes levels related to microbiological quality, such as the limit on the number of coliform organisms and chemical contaminants; physical quality, such as turbidity, color and odor; chemical quality such as the limit on iron; and radiological quality.

State Regulation

In addition to FDA's extensive regulatory requirements, the bottled water industry is also subject to state regulatory requirements. A significant responsibility of the states is inspecting, sampling, analyzing and approving sources of water. Under the federal GMPs, only approved sources of water can be used to supply a bottling plant. Another area in which some states have important responsibilities that complement federal regulation is the certification of testing laboratories. As with any food establishment, states perform unannounced spot inspections; some states perform annual inspections.

A. The Source

The FDA requires that:

- All sources shall be approved and developed in conformity with good recognized sanitary engineering practices.
- The source water(s) shall be periodically tested as required to verify that they are bacteriologically and toxicologically acceptable for chemical and physical quality, and tested weekly for bacteriological quality.
- Tests for radiological quality are required every four years.
- Source water shall be tested annually.

Essentially, the FDA is saying that a source is approved, if analysis shows that it meets the quality standard of your state which should have jurisdiction. In actual practice, the state will follow standards formulated by the Federal Environmental Protection Agency (EPA), which has been directed by the Safe Drinking Water Act, to set standards for public water supplies in the U.S.

B. Current Good Manufacturing Practice Definitions -

Operations Water

Water that is delivered under pressure from a source approved for drinking water by the official agency having jurisdiction, and used in a plant for container washing, hand washing, plant cleanup and other sanitary purposes.

Non-Toxic Materials

Materials for product water contact surfaces, transporting, storing, processing and packaging of bottled water, which are free of substances which may render the water injurious to health or which may adversely affect the flavor, color, odor or bacteriological quality of the product, and which meet the requirements of the FDA.

Sanitization

The application of an effective method or substance to clean surface for the destruction of pathogens and other micro-organisms. Such treatment shall not adversely affect the equipment, water, or health of consumers, nor leave a residual unacceptable under FDA guidelines.

Multi-Use Service Containers

Those articles intended for more than one use. These items shall comply with the requirements for sanitizing such articles, and shall not have any filth, residual or poisonous and deleterious substances as defined by the Food, Drug and Cosmetic Act. Three- and five-gallon bottles are considered Multi-Use Containers.

Single-Service Containers

Those articles intended for one use only and which normally would not be washed and sanitized prior to use, though such articles shall be examined and cleaned if necessary. The smaller bottles (500 ml, 1-litre and 1-1/2 liter) bottles fit into this category.

Unit Package

A standard commercial package of bottled water that may consist of one or more containers.

Adequate

That which is needed to accomplish the intended purpose in keeping with good public health practice.

Plant

The building, buildings, or parts thereof, used for or in connection with the manufacturing, processing, packaging, labeling, holding and shipping of bottled water.

Lot

A collection of primary containers or unit packages of the same size, type and style, produced under conditions as nearly uniform as possible, and designated by a common container code or marking.

Primary Container

The immediate container in which the product water is packaged.

Shipping Case

A container in which one or more primary containers of the product are held.

Product Water

Processed water by a plant for bottled drinking water.

Plant Equipment Features

Your Norland Bottled Water Plant has been uniquely designed and constructed to meet your needs. The plant incorporates different technologies to arrive at the highest quality drinking water possible. Following is a general explanation of the different technologies utilized in your plant.

1. Activated Carbon Filter

The first technology utilized in your plant, activated carbon filtration, is one of the most successful tools developed so far for removing tastes, odors and chlorine from water supplies. Carbon filtration will also remove organic compounds from water, which will lighten the load for the distillation system. Chlorine removal is the primary objective for the use of the carbon filter in your plant.

Chlorine in feed water has been shown to attack the welds in the stainless steel and shorten the overall life of the distillation system. It is also best to remove the chlorine from the feedwater prior to the water softener. This will maximize the life of the resin beads in the water softener.

The carbon contained in the filter should last approximately three years depending upon local conditions. Your system has been designed to ensure the water flowing through the carbon filter has adequate contact time. In many cases, the carbon filter is sized to permit additional distillation systems to be added without a change in the size of the carbon filter.

A chlorine test is normally utilized to ensure the carbon filter is working properly after it is installed. Under normal conditions, the feedwater will not require another chlorine test until after the first and second years of operation. After the third year, the feed water should be checked twice per month for

any signs of chlorine starting to make its way through the filter.

2. Ion-Exchange Water Softener

The second technology utilized in your plant is the most successful tool for the removal of hardness minerals prior to the water distillation system. Calcium and magnesium ions are mainly responsible for what is called “hard water.” If left in the feedwater going into your water distillation system, the calcium and magnesium ions will form a scale residue that will impair the operation of the distillation system. The scale residue will reduce the efficiency of the distillation system. Allowed to accumulate, the system will be rendered inoperable and require a de-scaling procedure.

Hard water scale is difficult and time-consuming to remove. Norland distillation systems have been designed to simplify this process, but it is far better to remove the hardness ions before they enter the distillation system.

The water softener removes calcium and magnesium ions on an “exchange” basis. A special resin (Cation) is used to attract the hardness ions as the feedwater passes through one of the system’s two resin tanks. The hardness ions are attracted to the resin, which releases or actually exchanges sodium ions. For each calcium or magnesium ion attracted to the resin, two ions of sodium are released.

Eventually all of the exchange sites on the resin bed will be used up. It is said the resin bed is then exhausted. At this time, the resin bed needs to be regenerated.

The regeneration process washes the resin bed to remove any dirt accumulation on top of the resin bed

and loosens and regrades the bed to ensure that the water passing through the resin tank is consistently softened and maximizes the life of the resin bed.

Next, a saturated brine solution is introduced to the resin bed. The brine solution washes the accumulated calcium and magnesium ions from the resin bed, which reverses the ion exchange reaction. The brine solution is formed in the water softener brine tank. Salt (sodium chloride) is periodically added to the brine tank and must be maintained in the brine tank for proper operation of the softener.

Your system includes a specially designed water softener that incorporates two resin tanks, one control valve (for controlling both resin tanks) and one brine tank. In a normal (single resin tank) water softener, hard water is delivered when the water softener is in the regeneration mode. The distillation systems operate most efficiently when they are delivered water with zero hardness ions.

Your system will alternate between the two resin tanks to ensure softened water is consistently and continuously delivered to the distillation systems. When one resin tank is being regenerated, the second resin tank is delivering softened water. When the regeneration process is complete, the tank waits in the “stand-by” mode until the operating resin tank nears exhaustion. This type of system will deliver nearly an endless supply of softened water, providing salt is always available in the brine tank.

3. VC Water Distillation System

Your plant utilizes one of the most advanced water distillation systems available in its class. The energy efficiency and ease of service of the Vapor Compression (VC) Distiller is unmatched. It produces a gallon of distilled water for a fraction of the cost of a typical distillation system. The VC also produces some of the best-tasting water possible.

During the distillation process, water is heated to boiling so it will vaporize, leaving bacteria, viruses and other impurities behind. As the water in the boiling chamber reaches near-boiling temperatures, a special centrifugal compressor turns on, which engages the unique non-contacted liquid ring seal.

The steam from the boiling chamber flows through a baffling system and then into the compressor. The baffling system helps to remove minute water droplets that may have been trapped in the steam.

In the compressor, the steam is pressurized, which raises the steam’s temperature before it is routed through a special heat exchanger located inside the boiling chamber. The steam (under pressure) is at a higher temperature than the feedwater inside the boiling chamber.

The pressurized steam gives off its heat to the tap water inside the boiling chamber, causing this water to boil, which creates more steam. In technical terms, the steam “gives up its latent heat of vaporization” to the water inside the boiling chamber. While the steam is giving up its latent heat, the steam will condense.

At this stage, the condensed steam is considered distilled water, but it is still very hot – only slightly cooler than boiling temperature. To get maximum efficiency from Norland systems, the hot distilled water preheats the incoming feed- water that will be distilled. As the incoming water is preheated, the outgoing distilled water is cooled. This allows the feedwater to be preheated to within a few degrees of boiling.

Preheating of the feedwater and cooling of the distilled water are done in the specially designed heat exchanger. These heat exchangers are designed for easier, faster cleaning than other makes of distillation systems, while still providing excellent heat transfer.

The VC is able to separate the distilled water from volatile gases that may be in the distilled water far better than other systems. Some contaminants boil at a lower temperature than the temperature of the feedwater. These contaminants are referred to as “volatile” and produce a gas when heated.

The volatile gas removal system built into the VC is the best in the world and has several patents pending on its design. Lesser distillation systems do not accomplish volatile gas removal as thoroughly as the

VC. Consequently, they cannot produce distilled water as high quality or as great tasting as the VC.

Norland VC systems are designed for maximum operating efficiency and dependability, using the highest grade of materials and components available. Type 304 and 316 stainless steel, titanium and other heavy-duty components are used to ensure long system operation life. In addition, the system uses few moving parts, to minimize maintenance requirements.

The VC is designed to automatically and constantly monitor the quality of the distilled water being produced. Should a malfunction occur in the distillation system, the distilled water that does not meet minimum quality standards will be diverted to the drain.

This feature prevents poor quality distilled water from being transferred to the storage tanks. The quality of the distilled water is also constantly displayed on the front panel of the VC. This allows the operator to monitor the quality at any given time with only a glance at the control panel.

4. Activated Carbon Post Filtration

After the distilled water is produced, it is pumped through a uniquely designed activated carbon filtration system, constructed specifically to further improve the quality of the distilled water.

The distilled water passes through one of three carbon cartridges, each located in a filter housing. The carbon filter is designed to ensure the distilled water is consistently high quality and as great tasting as possible. The carbon will remove any of the volatile gas contaminants from the feedwater that were not adequately removed in the volatile gas removal section of the distillation system.

The carbon filter cartridges are long-lasting and easy to replace. The assembly includes a water pressure gauge, which permits the operator to monitor system performance at a glance and know when to replace the cartridges. Suggested replacement frequency is also provided to ensure the distilled water is maintained at its peak.

5. Storage Tank

The high-density linear polyethylene storage tanks utilized in your system are designed for the storage of high-quality water. All internal tank surfaces are smooth to limit the number of rough surfaces that will support bacteriological growth.

The storage tank includes a 0.2 micron air filter that is designed to ensure the distilled water stored inside remains fresh and dirt- and bacteria-free. Also included is an activated carbon filter to destroy excess ozone that is vented from the storage tank. Providing proper levels of ozone are maintained in the storage tank, manual scrubbing and/or sanitizing of the tanks will be minimized. This will drastically slash the amount of manual cleaning of the storage tank.

A 16-inch manhole and cover are included in the top of the tank to permit easy access for cleaning and maintenance purposes. The tanks are translucent to enable you to view the water level in the tank without the use of additional sight glasses.

6. Post-Treatment

The product water contained in the storage tank and delivered to the fillers is treated with ozone (O₃) to maintain its freshness and great taste and to ensure it remains bacteria-free.

Ozone is an unstable, colorless gas and is a powerful oxidizer and a potent germicide. It has a much higher disinfection potential than other disinfectants such as chlorine. Chemically, ozone is three atoms of oxygen and is sometimes referred to as "supercharged oxygen."

Normal oxygen has two atoms of oxygen. Ozone with its three atoms of oxygen is very unstable. It quickly decomposes to normal oxygen, which is two atoms of oxygen plus one extra free oxygen. This extra oxygen is the one that does most of the oxidizing. It attacks most anything with which it comes in contact.

Ozone is used in the bottled water industry because it controls the growth of bacteria in water. It is desirable because it can do this without leaving a

residual taste, such as you would have with chlorine. Ozone oxidizes organic material that could give taste to the water if it were not removed during the distillation / post-filtering stages of the treatment / purification process.

The variables determining the effectiveness of ozone in killing bacteria are contact time and the residual ozone concentration achieved in the distilled water. This ozone concentration residual is first dependent on how much ozone is injected into the distilled water, and then the amount of ozone demand in the water. The ozone residual is also dependent on the total dissolved solids in the water. The lower the total dissolved solids level, the higher the solubility of the ozone.

The ozone concentration is also dependent on the pH of the water. The higher the pH, the lower the solubility. Additionally, ozone concentration is dependent on the temperature of the water. The lower the temperature, the higher the solubility.; If you have very cool water, more ozone is absorbed and it stays in the water longer. These are all factors that have been designed into your Norland Bottled Water Plant.

The proper level of ozone in the distilled water at all times is critical for completely bacteria-free product water. If there is too little ozone in the water when it is filled in the bottles, bacteria may show up in a laboratory test.

Your Norland Bottled Water Plant has been designed to minimize the chances of bacteria being allowed to enter the system after the water has been distilled. However, when the bottles are being filled, airborne bacteria may be introduced to the bottle during the filling process. It is virtually impossible to prevent this from happening.

Even with proper air treatment in the clean room, bacteria can still be allowed to enter. When ozone is at the proper level, any airborne bacteria will be quickly eliminated.

Too much ozone in the water can also create taste problems when the water is consumed. The ozone taste threshold in humans is quite low – only 0.02 to

0.05 mg/l. This means that if you taste water that contains more than 0.05 mg/l of ozone, you should definitely taste the ozone. It is often said the ozone gives the water a bitter taste until the ozone dissipates.

The “half-life” of ozone is approximately three hours at 70° F. This means that the strength of the ozone decreases by half every three hours. The half-life of the ozone is dependent upon the temperature of the water.

Normally, the ozone in the bottles has dissipated prior to the time the water has been delivered to the consumer and has been consumed.

Excess ozone is vented from the storage tanks in your system. Your Norland Bottled Water Plant is designed to ensure that excess ozone is destroyed in the storage tank air filter.

This carbon filter requires periodic replacement according to the maintenance sheet supplied elsewhere in this manual. If the excess ozone were not destroyed, the ozone could potentially cause problems in the surrounding area of the bottling plant.

7. Bottle Washing

Your Norland Bottle Washers (BW60, BW150, Triton 160, or Triton 450) is an extremely important process in the product cycle. Unlike any other process within the plant, the washer is responsible for the sanitation of a returnable container. This is the only area in the product cycle where we must handle and ensure sanitation of an item, which has left the premises and has been returned.

A bottle may have been exposed to hundreds of undesirable conditions. Consequently, it is essential that you maintain a reliable, properly functioning bottle washer.

The BW has been designed with separate wash, sanitize and rinse areas. The washing and sanitizing cycles are designed to wash and sanitize each bottle for 60 seconds. The washer is factory- programmed to maintain a wash water temperature at 120° to

140° F. Higher wash temperatures are not recommended when washing polycarbonate bottles.

High-pressure, stainless steel jet nozzles are positioned to spray water directly into the bottle openings. This pressure cleans both the inside of the bottle and slightly lifts the bottle, allowing the exterior spray jet to create the unique “lift and spin” effect, which ensures a cleaner bottle exterior as well. The result is a significantly cleaner bottle in less time, with less wastewater.

Norland recommends the use of special detergent and sanitizing solutions for clean bottles. The wash and sanitize solutions are recirculated for better economy and maximum efficiency.

8. Bottle Filling

Your plant has been designed so that you can fill both small (295 ml to 1 liter) bottles and large (1, 3 - and 5-gallon) bottles.

Large bottles are filled after they have been washed, sanitized and rinsed, and are then capped. Most bottlers utilize reuseable labels on their 3- and 5-gallon bottles so, in most cases, the bottles only require labeling once.

Large bottles are filled and capped on the BF150 Filler, the ideal companion to the BW150 Washer. The BF150 is constructed of stainless steel and other food grade-approved materials, is ozone safe and is able to be quickly and easily sanitized prior to beginning the day’s bottling operation.

In addition to these items, your plant is made up of other materials specifically suited for your operation. These materials were selected for compatibility with the major components and to meet your specific needs.

Plant Construction, Design and Safe Operation

Your Norland Bottled Water Plant should be constructed, designed and operated in a sanitary and safe manner at all times. Proper planning can assist you in meeting these and other objectives for your plant.

1. Grounds

The grounds around a bottled water plant under the control of the operator, shall be free from conditions which may result in the contamination of the product including, but not limited to the following:

- a. Improperly stored equipment, litter, waste, refuse, and uncut weeds or grass within the immediate vicinity of the plant buildings or structures that may constitute an attractant, breeding place or harborage for rodents, insects or other pests.
- b. Excessively dusty roads, yards or parking lots that may constitute a source of contamination in areas where product is exposed.
- c. Inadequately draining areas that may contribute contamination to products through seepage or foot-borne filth, and by providing a breeding place for insects or microorganisms.
- d. If the plant grounds are bordered by grounds not under the operator's control of the kind described in subparagraphs (a), (b) and (c) of this section, care must be exercised in the plant by inspection, extermination or other means to effect exclusion of pests, dirt or other filth that may be a source of product contamination.

2. Plant Construction and Design

Plant buildings and structures shall be suitable in size, construction and design to facilitate maintenance and sanitary operations for bottled water processing purposes. The plant and facilities shall:

- a. Provide sufficient space for the placement of equipment and storage of materials as is necessary for sanitary operations and production of safe bottled water products.

Floors shall be smooth, impervious, properly drained and maintained in a state of good repair and shall be kept clean and free from waste, litter and extraneous material. Floors in new construction in wet areas should be pitched to properly trapped drains.

The joints between the walls and floors shall be tight and impervious, and in bottling areas shall have covered joints.

Walls in the plant shall be of such construction as to be adequately cleanable and in good repair.

Fixtures, ducts and pipes shall not be suspended over working areas where drip or condensate may contaminate products or product contact surfaces.

Aisles or working spaces between equipment and/or between equipment and walls, shall be unobstructed and of sufficient width to permit employees to perform their duties without the contamination of product or product contact surfaces from clothing or personal contact.

- b. Provide separation by partition, location or other effective means for those operations, which

may cause contamination of product with undesirable microorganisms, chemicals, filth or other extraneous material.

All bottling rooms shall be separated from other plant operations or storage areas by tight walls and self-closing doors to protect against contamination.

No storage shall be permitted in bottling rooms. Conveyor openings shall not exceed the size required to permit the passage of containers.

- c. Provide adequate lighting by natural light, artificial light or both. Light must be provided to all areas where product water is examined, processed or stored and where equipment and utensils are cleaned. A minimum of 50-foot candles must be provided in any product inspection station.

Light bulbs, fixtures, skylights or other glass suspended over exposed product in any step of preparation, shall be of the safety type or otherwise protected to prevent product contamination in case of breakage.

- d. Provide adequate ventilation and/or control equipment to minimize odors and the formation of excessive condensation, noxious fumes or vapors, including steam, in areas where they may contaminate products. This equipment shall not create conditions that may contribute to product contamination by airborne contaminants, especially in bottling rooms, and shall be kept free of accumulation of dust and soil. Positive pressure ventilation in bottling rooms is recommended.

3. Bottling Room Construction

The FDA requires that bottle washing and filling operations be conducted in an enclosed space, not necessarily separate rooms. To protect cleaned and sanitized bottles from possible contamination by insects, dust, etc., while the bottles are being moved from the washer to the filler, a conveyor cover is required. Stainless steel or Plexiglas® are two preferred materials for a gentle V-shaped “roof” over the conveyor line. The cover should be within

a few inches of the bottle necks, and the width should be sufficient to protect the shoulders of the bottles.

a. Air Blowers

Conveyor openings into the bottling room shall not exceed the size required to permit passage of the bottles. All openings into bottling areas shall be effectively screened and/or otherwise protected against the entry of insects, dust and airborne contamination.

An air filtration system should be placed so the room has a positive airflow out of the room. Positive airflow will help to reduce the amount of dirt and other airborne contaminants entering the room.

b. Filler Room Construction

For ease and efficiency of cleaning, the filler room floor should be constructed with a smooth (no pits), hard, non-porous surface. Walls and the ceiling should be smooth and washable. The lights in the room should ideally be flush to their surfaces.

Any windows in the room should be the non-opening type. A positive pressure ventilation system should supply a plentiful amount of filtered air to the room.

Norland can make specific recommendations on the design and construction of your filler room.

4. Control of Hazardous Materials - General

- a. FOR AN EMERGENCY INVOLVING CHEMICALS, CALL CHEMTREK at: **1-800-424-9300** FOR INSTRUCTIONS.

This is an organization formed by the chemical companies of America to provide 24-hour service anywhere in the United States.

- b. Handling Precautions

(1) Wear proper clothing. Before opening a container or otherwise working with water processing chemicals such as acid and caustic, put on the proper protective clothing:

- Glasses worn under a full face shield
 - Rubber apron
 - Long rubber gloves
- (2) Provide good ventilation in the working area.

- (3) Wear a National Institute of Occupational Safety and Health-approved respirator, if process causes fumes.
- (4) Provide a source of running water nearby.

Quality Control / Product Water Testing Processes

Production of high-quality bottled water on a daily basis requires adherence to a quality control program. Norland and the bottled water industry recommend that records of all tests should be maintained for a minimum of five years.

A proper quality control program includes frequent in-house testing as well as required compliance testing. In-house testing refers to tests conducted at the bottling plant by plant personnel before and during water processing.

The monitoring frequency for in-house testing may be based on a timed schedule. For example, ozone residual should be tested at start-up, then periodically throughout the production run.

Tests required by the FDA's GMPs, plus the bottled water industry control program for finished product, include:

1. Complete water analysis (chemical, physical and radiological) – at initial plant start up and once each year thereafter.
2. Bacteria – a minimum of five tests per month per product water; monthly for feedwater supplies.
3. Taste – start-up of every product run and once per shift.
4. Ozone – start-up of every product run and twice per product per day.
5. pH – every hour if processing; Daily if not processing.

6. Conductivity – start-up of every product run and every hour if processing; if not processing, once daily.
7. Detergent Concentration – start-up of every product run and then at 2-hour intervals (wash water detergent).
8. Detergent Carry-over in Washed Bottles – start-up of every product run.
9. Sanitizer Concentration – at start-up of every product run and then at 2-hour intervals.

PLEASE NOTE: *Some of the test kits contain chemicals that may be hazardous to the health and safety of the user if inappropriately handled, used or stored. Please read all warnings before performing each test and use appropriate safety equipment. As with all supplies for your bottled water operation, please store all test kits and chemicals away from unauthorized users.*

Daily Checklist Form

The *Daily Checklist Form* from Norland is designed to assist you with your quality control program. It incorporates the items listed previously with other testing and analysis that is required on a periodic, daily, weekly and monthly basis.

The Daily Checklist Form has been designed specifically for your plant.

A copy of the Daily Checklist Form is included in each equipment manual. Check with your local government regulator for testing and maintenance

recommendations, as well as your equipment manual. This review process ensures that your plant is operating to its fullest potential. It may also be

possible to advise you of potential troubles that may be looming and can be avoided. This should reduce downtime and maximize your plant's profits.

Complete Analysis

Bottled water shall meet standards of chemical quality. The bottled water should be tested prior to distributing or selling the first bottle to a customer. The water shall not contain chemical substances exceeding the following concentrations:

<u>Substance</u>	<u>Maximum Concentration in mg/l</u>
Aluminum.....	0.2
Arsenic	0.05
Barium.....	1.0
Benzene	0.005
Cadmium	0.01
Carbon tetrachloride.....	0.005
Chloride.....	250.0
Chromium.....	0.05
Copper	1.0
<i>o</i> -Dichlorobenzene	0.6
<i>p</i> -Dichlorobenzene	0.075
1,2-Dichloroethane	0.005
1,1-Dichloroethylene.....	0.007
<i>cis</i> -1,2-Dichloroethylene	0.07
<i>trans</i> -1,2-Dichloroethylene	0.01
1,2-Dichloropropane.....	0.005
Ethylbenzene	0.7
Iron	0.3
Lead.....	0.05
Manganese.....	0.05
Mercury	0.002
Monochlorobenzene	0.1
Nitrate (N)	10.0
Nitrite	1.0
Total Nitrate & Nitrite.....	10.0
Phenols	0.001
Selenium.....	0.01
Silver	0.05
Styrene.....	0.1
Sulfate.....	250.00
Tetrachloroethylene.....	0.005
Toluene.....	1.0
Total Dissolved Solids (TDS)	500.0
1,1,1-Trichloroethane	0.20
Trichloroethylene	0.0005
Vinyl chloride.....	0.002
Xylenes.....	10.0
Zinc.....	5.0
Alachlor.....	0.002
Atrazine	0.003
Chlordane	0.002

1,2-Dibromo-3-Chloropropane.....	0.0002
Endrin	0.0002
Ethylene dibromide	0.00005
<u>Substance</u>	<u>Maximum Concentration in mg/l</u>
Heptachlor	0.0004
Heptachlor epoxide.....	0.0002
Lindane	0.004
Methoxychlor	0.01
Pentachlorophenol	0.001
PCB s.....	0.0005
Toxaphene	0.005
2,4-D.....	0.1
2,4,5-TP Silvex.....	0.001
Total Trihalomethanes.....	0.10

Radiological Quality

Bottled water shall, when a composite of analytical units of equal volume from a sample, meet the standards of radiological quality as follows:

1. The bottled water shall not contain a combined radium-226 and radium-228 activity in excess of 5 picocuries per liter of water.
2. The bottled water shall not contain a gross alpha particle activity (including radium-226, but excluding radon and uranium) in excess of 15 picocuries per liter of water.
3. The bottled water shall not contain beta particle and photon radioactivity from man-made radionuclides in excess of that which would produce an annual dose equivalent to the total body or any internal organ of 4 millirems per year calculated on the basis of an intake of 2 liters of the water per day. If two or more beta, or photon-emitting radionuclides, are present, the sum of their annual dose equivalent to the total body or to any internal organ shall not exceed 4 millirems per year.

Bacteria Test

In order to meet the FDA's GMPs for bottled water, the distilled water from your plant shall be tested a minimum of five times per month. You will want to know for certain there is no bacteria present in the bottled distilled water to be provided to your customers. This bacteria test will provide you with that assurance.

When tested, the water sample contains NO bacteria if the sample shows clear. A yellow color develops in the sample if bacteria is present.

The bacteria test requirement is able to be met with the Colilert™ Bacteria Absence / Presence Test Kit available from Norland. This test will allow you to determine whether total coliforms and *E. coli* bacteria are present or absent from the distilled water sample. Please note that this test is not an ideal test to quantify the amount of bacteria if found.

It is normally a good idea to check for bacteria once each day during the first week of operating your new plant. Providing the distilled water samples that are analyzed show "absence," that is, they contain no bacteria, the sampling can be cut back to meet minimum testing requirements.

Full instructions are included with the bacteria testing kit. Following is an overview of the proper procedures to be used with the Colilert test kit.

Procedural Notes

1. Adhere to good laboratory practice throughout the test procedure. Avoid touching the reagent or the inside of the reaction vessels or caps.
2. Colilert is for analytical testing only.
3. If doing multiple tube analysis, do not pipette (draw the liquid into the testing piece) by using your mouth.
4. Thoroughly mix all samples immediately before inoculating.

5. Never autoclave Colilert prior to use. This process will destroy the reagent system, which is heat-sensitive.
6. Avoid prolonged exposure of the inoculated Colilert to direct sunlight. The indicator compounds may be hydrolyzed, creating a false positive (yellow) result.
7. After inoculation, Colilert should be incubated for 24 hours at $35^{\circ} \pm 0.5^{\circ}\text{C}$. Avoid incubation at this temperature beyond 28 hours because heterotrophic bacteria present may overcome the suppressant systems after this time, yielding a false positive result. Yellow color after the 28-hour incubation period should be verified or the sample repeated.
8. Colilert is primarily a water test. Colilert performance characteristics do not apply to samples altered by any form of pre-enrichment or concentration. This includes any method such as growth on a membrane filter or growth in lactose-based broth, in which there is a non-specific growth-enhancing step, or any pre-filtration method such as altering the sample through a membrane filter and then using the filter to inoculate in Colilert.
 - a) Do not transfer colonies or cultures pre-grown in any enrichment media to Colilert. Colonies grown in such non-specific media may or may not be coliforms. Colilert's suppressant reagents may be overloaded by transferring such heavy inocula of certain very weak B-galactosidase containing non-coliforms (e.g., some *Aeromonas* and *Pseudomonas*), causing a false positive total coliform (yellow) result. Similarly, transfer of high numbers of other heterotrophs (for example, *Flavobacterium*) can cause a false positive B-glucuronidase fluorescence and an inaccurate indication that *E. coli* is present. While one would not normally expect to encounter such extremely high levels of heterotrophs in a water sample, pre-enrichment could produce them.

- b) Do not pre-filter a sample and then place that filter in Colilert. The filtration step can concentrate coliforms but also non-coliforms, heterotrophs, particulates and certain chemicals (divalent cations, heavy metals, etc.), which can overlay and suppress coliforms and adversely affect the sensitivity of the test. Furthermore, coliform bacteria can become trapped in the filter, restricting their access to the indicator nutrients in the Colilert reagent and their subsequent growth and detection.
9. Do not dilute a sample in buffered water for addition to Colilert. Colilert is already buffered, and additional buffer compounds can adversely affect the growth of the target microbes and test performance.
 10. If additional confirmation is desired after incubating 24 to 28 hours and reading results, transfer 0.1 ml with a pipette to EC+MUG or other confirmation media.
 11. Upon mixing the Colilert reagent with the sample, a transient blue color may appear in samples containing an excessive amount of free chlorine. The sample should be considered invalid and testing discontinued.
 12. As with any coliform test method, if large numbers of refrigerated samples are prepared for incubation simultaneously, they should be warmed to room temperature before being placed in the incubator to avoid chilling of the incubator contents, especially when using smaller low-wattage incubators.

Presence/Absence Test Procedure

1. Carefully separate one Colilert Snap Pack from the strip, taking care not to accidentally open the next pack.
2. Tap the Colilert reagent snap pack to ensure that all the Colilert powder is in the bottom part of the pack.
3. Aseptically open one pack by snapping back the top at the scoreline. (The top remains attached to

the rest of the pack.) **Caution: Do not touch the opening of pack.**

4. Add the contents to a water sample of correct volume in a sterile, transparent, non-fluorescent borosilicate glass container or equivalent. For Catalog Nos. WP020/WP200, use with 100 ml sample. For Catalog Nos. W050/WOSOB, use with 50 ml sample. Aseptically cap and seal the vessel.
5. Shake vigorously by repeated inversion to aid dissolution of the reagent. Some particles may remain undissolved. Dissolution will continue during incubation.
6. Incubate reagent/sample mixture at $35^{\circ} \pm 0.5^{\circ}\text{C}$ for 24 hours.
7. Read the reaction at 24 hours. If yellow color is seen, check for fluorescence. Color should be uniform throughout vessel. If not, mix by inversion before reading.

Test Results and Interpretation

At 24 hours, compare each reaction vessel against the color comparator dispensed into an identical vessel. If no yellow is observed, the test is negative for total coliforms and *E. coli*. If the sample has a yellow color greater or equal to the comparator, the presence of total coliforms is confirmed.

If yellow is observed at 24 hours, check each vessel for fluorescence by placing the U.V. lamp three to five inches (8 - 13 cm) in front of the sample, and making sure that it is facing away from your eyes and toward the vessel.

Observe for fluorescence in a dark environment**. If fluorescence of vessel(s) is greater or equal to fluorescence of the comparator, the presence of *E. coli* is specifically confirmed.

The comparator is the lowest level of yellow and fluorescence, which can be considered positive. A typical positive test is much more intense than the comparator.

If a sample is yellow after 24 hours of incubation, but slightly less than the positive comparator or indeterminate, it may be incubated up to an additional 4 hours (but no more than 28 hours total). If the sample is coliform positive, the color will intensify. If it does not intensify, consider the sample negative. If the sample color remains indeterminate, the laboratory should consider the sample invalid and request another sample from the same site. Some water samples containing humic material may have an innate color. If a water sample has background color, compare the inoculated Colilert vessel to a control blank of the same water sample.

If an inoculated Colilert vessel is inadvertently incubated over 28 hours, the following guidelines apply: No yellow color is a valid **NEGATIVE TEST**. A yellow color after this incubation period should be verified or the test repeated.

** If a pocket battery-operated long wavelength (365 nm) U.V. lamp is used, check for fluorescence by placing lamp two inches from the sample.

For Quantitative Results (MPN)

1. Follow Test Procedure - Presence/Absence steps 1 through 5.
2. Mix sample/reagent mixture thoroughly and aseptically pipette sample reagent mixture into sterile glass MPN tubes. For 100 ml samples, use five 20 ml tubes or ten 10 ml tubes. For 50 ml samples, pipette into five 10 ml tubes.
3. Cap the tubes tightly and incubate 24 hours at $35^{\circ} \pm 0.5^{\circ}\text{C}$
4. Read the tubes at 24 hours. If yellow color is seen, check for fluorescence. Color should be uniform throughout the tube. If not, mix by inversion before reading.
5. Refer to Test Results and Interpretation and MPN Tables.

Taste

Distilled water produced by a Norland distillation system is normally thought to be the best tasting water possible. Since virtually all contaminants have been removed from the distilled water, there is essentially nothing to detract from the natural, good taste of the water.

Norland distillation systems have a superior volatile venting system designed to ensure that the distilled water produced in one area of the world is the same high quality taste as in any other area.

The taste of the distilled water should be sampled prior to the start of each production run. This will ensure that your customers receive only the highest quality water possible.

If possible, it is best to identify one person in your organization with a very sensitive tasting ability and have this person taste the water sample each day.

The taste of the distilled water should be consistent and very pleasant. If any off-tastes or odors are detected, the situation will have to be remedied prior to starting to bottle the water.

Ozone

The ozone level of the distilled water needs to be tested twice per day. It's normally best if the first test of the ozone level is done prior to the start of the bottling operation. This will ensure the ozone level is sufficiently high, but not overly high. The ideal range for the ozone level is between 0.1 - 0.4 mg/l.

Norland recommends use of the O₃ Pocket Colorimeter testing kit to identify the level of ozone in your water. This model is calibrated to accurately measure ozone in water samples from 0 to 0.25 mg/l and 0 to 0.75 mg/l. The liquid crystal display (LCD) provides a direct readout in mg/l of ozone.

Power to the tester is supplied by four AAA alkaline batteries. Typically, a set of batteries will provide approximately 750 tests before replacement is required.

Full instructions for operating the Pocket Colorimeter are included with the test kit. An overview of the instructions is included here for a permanent record.

Before testing a water sample, make sure the instrument is in the correct mode. For the low range ozone test (0 to 0.25 mg/l), the instrument should be in the LO range mode. When ZERO is pressed, the display will show three zeros (0.00). For the high range test (0 to 0.75 mg/l), the instrument should be in the HI range mode. When ZERO is pressed, the display will show two zeros (0.0).

To change modes, press the ZERO and READ keys at the same time. After one second, release the ZERO key and continue to hold the READ key until the letters "HI" or "LO" appear in the display. HI or LO indicates the range the instrument is currently using.

If the display shows "CAL" followed by a flashing "0", the ZERO key was released soon enough and the instrument has entered the calibration routine. To exit from the calibration routine, press both the ZERO and READ keys simultaneously and hold them for two seconds. The instrument exits to

normal mode and "ESC" appears and remains displayed until the ZERO or READ key is pressed (this also performs the function of the pressed key) or until automatic shut-off occurs.

1. Gently collect at least 40 ml of sample water in a 50 ml beaker. *NOTE:* Samples must be analyzed immediately and cannot be preserved for later analysis.
2. Collect at least 40 ml of ozone-free water in another 50 ml beaker. *NOTE:* Ozone-free water used for the blank may be either distilled or tap water.
3. Fill one Indigo Ozone Reagent AccuVac Ampule of the appropriate range with the sample and another ampule with the blank. The ampule containing the sample is the prepared ozone sample solution. The ampule should be inserted into the water sample and the end of the ampule should be broken to allow water to fill the ampule. *NOTE:* Keep the ampule immersed while it fills completely.
4. Quickly invert both ampules several times to mix. Wipe off any liquid or fingerprints. *NOTE:* Part of the blue color will be bleached if ozone is present.
5. Place the ampule containing the blank into the cell holder.
6. Cover the sample cell with the instrument cap (the flat side should face the back of the instrument). Be sure the cap fits tightly against the instrument.
7. Press ZERO. The instrument will turn on and the display will show " - - - ," then 0.00. *NOTE:* The instrument will automatically shut off after one minute, and the last zero will be stored in memory. Press READ to complete the analysis.

8. Remove the ampule containing the blank. Place the AccuVac ampule containing the sample into the cell holder.
9. Cover the sample cell with the instrument cap (flat side should face the back of the instrument). Be sure the cap fits tightly against the instrument.
10. Press READ. The instrument will show “- -,” followed by the results in mg/l of ozone.

NOTE: If the display flashes 0.30 in the low range or 0.80 in the high range mode, the ozone concentration is beyond the instrument’s range. If this occurs in the low range, repeat the test using the high range calibration and 0 to 0.75 mg/l ozone reagents. If this occurs in the high range mode, dilute a fresh sample and repeat the test. A slight loss of ozone may occur due to dilution. Multiply the result by the appropriate dilution factor.

pH

The term pH commonly used in water chemistry is expressed as a number from 0 - 14 and indicates whether the water is acidic or basic (or alkaline). If it were possible to have such a thing, 100% pure water would have a pH of 7, that is, neither acidic nor alkaline. A pH value of less than 7 indicates the water is acidic. A number greater than 7 indicates the water is alkaline.

The distilled water from your plant will typically have a pH value of 5.8 - 6.2. This is due to the fact that virtually everything that contributes to a higher or lower pH has been removed during the distillation process. The pH of distilled water is lowered to 5.8 - 6.2, due primarily to the carbon dioxide that is dissolved in the distilled water after it is condensed and stored in the storage tanks. The carbon dioxide is converted to carbonic acid, a very weak acid.

The pH of the water is measured with a pH meter, such as the one available from Norland. The pH meter is inserted into a water sample.

When you open the pH meter, do not be alarmed if white crystals form around the cap. This is a normal occurrence, and the crystals will dissolve during the meter conditioning process.

Before first use, condition the meter. Remove the cap and immerse the electrode in tap water for one hour to activate the electrode and dissolve any crystals that may have formed while the meter was in storage.

pH Testing

1. Remove cap and press ON/OFF button on the keypad to turn on the pH tester.

2. Dip the electrode 1/2 in. to 1 in. into the solution, but never above the color band on the side of the tester.
3. Stir once, and let the display stabilize. Note the pH.
4. Allow a couple of minutes for the Automatic Temperature Compensation (ATC) feature to correct for temperature changes of the sample.
5. Press the HOLD/CON button if you wish to hold the reading. Press it again to release it.
6. Press the ON/OFF button to shut it off. The automatic shutoff feature will shut the meter off after 8.5 minutes to conserve batteries.

Maintenance

Rinsing the electrode with distilled water after using the meter will extend its useful life. After measuring aggressive solutions, take the measurement quickly and then rinse the electrode immediately. To maximize the life of the electrode, place a small sponge in the cap, moisten with distilled water and replace cap.

Error Messages

The meter includes error messages for self-diagnosis.

ER1 means the batteries are low and should be replaced.

ER2 means the wrong buffer solution value has been selected for calibration or the electrode is contaminated.

OR means the signal is out of range, possibly from a voltage applied to the solution.

Conductivity

In water chemistry, conductivity is the measure of a solution's ability to allow an electric current to flow through it. This electrical current measurement is a means that allows one to determine the general quality of a water sample. Generally speaking, the lower the conductivity of the water, the better the quality of the sample being measured.

The items in water that conduct electricity are elements and compounds such as lead, mercury, arsenic, nitrate, sodium chloride, calcium chloride, etc. There can be many other items in water that do not conduct electricity, so conductivity is normally used only as a basic guide to the overall quality of water sample. For instance, if you have water that has a conductivity reading of 10 mg/l and you add a teaspoon of sugar to the water sample, the conductivity will not change.

Water conductivity is normally expressed in terms of micromhos, mg/l (milligrams per liter) or in ppm (parts per million). The term micromho is normally used in laboratories. The reading is normally expressed in terms of X amount of TDS (Total Dissolved Solids) contained in the water.

Distilled water has a conductivity reading of 10 mg/l or less. Distilled water from a Norland distillation system is normally in the range of 1 - 3 mg/l. Tap water samples in the U.S. normally measure from 50 - 500 mg/l.

Conductivity of a water sample is measured with a conductivity meter. The meter available from Norland contains a small cup that holds the water sample while the activating buttons are depressed and held. The meter then provides a reading of conductivity, normally expressed in Microsiemens/cm or TDS in parts per million (ppm). The measurement of ppm is essentially the same as a reading in mg/l. Most of the readings required for

the industry and for Norland are expressed in terms of mg/l.

To measure a sample of water with the model 6000 meter from Norland:

1. Rinse the cup with the water sample to be measured twice before reading the conductivity of the sample.
2. Fill the cup to the full line (approximately 1/4" from the top of the cup).
3. When measuring a distilled water sample, depress the "0 - 199.9" and PPM buttons simultaneously. The readout will indicate the conductivity of the sample.

When measuring a tap water sample, start with the lowest range button until the reading is displayed. Higher range(s) than necessary will not provide an accurate reading.

4. Rinse the cup with distilled water after each use.
5. Record the measurement in the daily log in mg/l. The measured TDS in ppm is the same as mg/l.

Maintenance

The 6000 meter should be treated like any other sensitive instrument. It should be protected from shock and should not be immersed in water. Water spillage from the test cup should be removed with a cloth or soft paper towel. Clean the meter as required with a damp cloth and a mild detergent.

The Low Voltage indicator will go on when the battery requires replacement. The 9-volt battery furnished with the meter will provide approximately 24 hours of testing before it requires replacement. Replace the battery with a DURACELL® alkaline battery or equivalent.

Detergent Concentration

The detergent used in the bottle washer needs to be checked at the start of a production run and periodically thereafter to ensure it is of proper strength. Norland Int'l. recommends the use of *Chem Clean 1862* in the BW150. This detergent has been shown to offer excellent results without causing cracking or crazing (surface haze) to polycarbonate bottles.

Other brands of cleaners can be used with the BW150. If you elect to use a different brand of detergent, you will need to work with the supplier to determine the proper test procedure to ensure the detergent is at the proper concentration. The wash and sanitize tanks each hold approximately 25 gallons (95 liters) of water.

The following procedure allows you to check the strength of the *Chem Clean 1862*.

Detergent Test Procedure

This procedure is used to determine the concentration by volume of *Chem Clean 1862* in the wash tank of the BW150.

The Detergent Test Kit available from Norland contains the following items:

- 1 X 125 milliliter (ml) beaker
- 1 X 5 milliliter pipette with rubber squeeze bulb
- 1 X bottle of phenolphthalein - Indicator #1
- 1 X bottle of 1.0 N HCL - Indicator #5

PLEASE NOTE: The 5 ml pipette with rubber squeeze bulb when filled to the "5" mark indicates the Pipette contains 5 ml. The smaller marks between the numbers 1 - 5 are graduated into 0.1 (1/10th) of a milliliter.

The 1.0 N HCL solution needs to be diluted 10:1 prior to use. The solution is concentrated to maximize the number of tests able to be performed using this bottle.

To dilute the solution 10:1:

1. Pour 5 ml of 1.0 N HCL into the beaker supplied with the kit.
2. Add distilled water to the 50 ml line of the beaker.
3. Pour solution into a clean bottle for future use. Be sure to label the bottle properly and seal with a cap.

To test detergent strength:

1. Place a 50 ml sample of wash water containing *Chem Clean 1862* solution into the clean 125 ml beaker (sample to be taken from wash tank).
2. Add four drops of Indicator #1 (phenolphthalein). Solution will turn pinkish red.
3. Using the 5 ml pipette, add one drop of testing solution #5 (diluted 0.1N HCL solution) at a time until the pinkish red color disappears. Swirl the water in the beaker as each drop is added. Count the number of mls required to affect the color change.

Results: Multiply the number of mls of testing solution #5 used in step 3 by 1.7% to determine percent by volume of *Chem Clean 1862* in solution.

Example: 0.6 ml of testing solution #5 was used to turn a solution to clear as in step 3. The percentage of *Chem Clean 1862* in solution is 0.6 times 1.7% = 1.2%.

BW150 ADDITION CHART FOR *CHEM CLEAN 1862* brand Detergent

The following chart gives the amount of *Chem Clean 1862* to add to the BW150 wash solution for various levels of testing solution so that 1% of *Chem Clean* will be in solution by volume.

<u>ml of 0.1 N HCL</u>	<u>% Solution</u>	<u>Amount of <i>Chem Clean</i> to Add (by volume)</u>
0.6 ml	1.00%	0.0
0.5 ml	0.85%	5.5 oz
0.4 ml	0.68%	11.5 oz
0.3 ml	0.50%	17.9 oz

Note: Do not allow the solution to drop below 1.0% for proper detergent effectiveness.

Detergent Carry-over in Washed Bottles

At the start of each production run, you should test the detergent carry-over in a washed bottle to ensure the washer is operating properly. The most accurate method of testing for detergent carry-over is to remove a bottle immediately after the rinse cycle and catch the rinse water from inside the bottle. If an insufficient amount of water is available, it may be necessary to add a small amount of distilled water to the bottle and then test this water sample.

1. Place a 50 ml sample of water from a bottle into a clean 125 ml beaker.
2. Add four drops of Indicator #1 (phenolphthalein). Solution will turn pinkish red.
3. Using the 5 ml pipette, add one drop of testing solution #5 (diluted 0.1 N HCL solution) at a time until the pinkish red color disappears. Swirl the water in the beaker as each drop is added. The pinkish red color should disappear after the first drop.

Sanitizing Solution Strength

Approximately one liter of product water is used to rinse each bottle in the BW150. The rinse water flows into the sanitizing water, which overflows and goes down the drain. The sanitizing water is diluted as each bottle is rinsed with product water.

Norland has an optional feature on the BW150 that ensures the sanitizing solution is maintained at the proper strength—the chemical injection pump. This feature is designed to add a pre-measured amount of sanitizing solution as each bottle is rinsed.

You still need to periodically measure the solution strength to ensure the pump is operating properly.

Each time you drain and refill the sanitize tank, you should add 3.8 ounces of *EcoSan* or an equivalent brand of sanitizing solution. (If you are using another brand of sanitizing solution, you will need to check with the manufacturer for their recommendation on the amount to be added.)

By using one of the high range chlorine test strips, you can determine the sanitizing strength. The ideal solution strength is 100 mg/l (ppm). If the solution is not at 100 mg/l after refilling the sanitizing tank and adding sanitizing solution, you will need to add an additional amount of solution to bring it within the desired strength.

Hardness Test Kit

The Hardness Test Kit from Norland allows you to measure both low and high ranges of hardness. The low range is used for measuring the amount of water hardness that remains after the water softener. It's best if the water feeding the VC1500 contains zero grains of water hardness. If water hardness is allowed to enter the VC1500, the system will not operate as efficiently as designed. Eventually, the VC1500 will require a de-scaling procedure if the softener is not readjusted.

The high range is used for measuring the amount of water hardness in tap water supplies. This reading is required for setting the water softener for proper softener operation when the plant is commissioned

To test for Low Range:

1. Fill the flask to the 100 ml mark with water to be tested.
2. Add two droppers-full of buffer solution, Hardness 1, to the flask and swirl to mix.
3. Add four drops of ManVer 2 Hardness Indicator, Hardness 2 to the flask. Swirl to mix. A blue color indicates soft water. If a red color develops, proceed to step 4.
4. Add Titrant Reagent, Hardness 3, drop by drop, to the flask. Swirl the flask constantly as the drops are added. Count each drop as it is added, and continue to add reagent until the color changes from red to blue.

5. Each drop of Titrant Reagent, Hardness 3, used to bring about the color change is equal to 1 mg/l of hardness (as calcium chloride).

After the test is complete, thoroughly rinse the flask with distilled water prior to replacing the flask in the case.

To test for High Range:

1. Fill the plastic measuring tube level full with the water to be tested. Pour the contents of the tube into the mixing bottle.
2. Add three drops of Buffer Solution, Hardness 1, to the bottle and swirl to mix.
3. Add one drop of ManVer 2 Hardness Indicator, Hardness 2, to the flask. Swirl to mix. A blue color indicates soft water. If a red color develops, proceed to step 4.
4. Add Titrant Reagent, Hardness 3, drop by drop, to the flask. Swirl the flask constantly as the drops are added. Count each drop as it is added, and continue to add reagent until the color changes from red to blue.
5. Each drop of Titrant Reagent, Hardness 3, used to bring about the color change is equal to 1 grain per gallon of hardness (as calcium chloride). One grain per gallon (gpg) is equal to 17.1 mg/l of hardness.

After the test is complete, thoroughly rinse the mixing bottle with distilled water prior to replacing the bottle in the case.

Chapter 5

Plant Sanitation

A. Processes and Controls

All operations in the receiving, inspecting, transporting, packaging, segregating, preparing, processing and storing of bottled water shall be conducted in accordance with adequate sanitation principles. Overall sanitation of the plant shall be under the supervision of an individual assigned responsibility for this function. All reasonable precautions shall be taken to ensure that production procedures do not contribute contaminants such as filth, harmful chemicals, undesirable microorganisms or any other objectionable material to the processed product including:

Processing equipment: Processing equipment shall be maintained in a sanitary condition through frequent cleaning, including sanitation where indicated.

1. Production

All bottled water production, including packaging and storage, should be conducted under such conditions and controls as are necessary to minimize the potential for undesirable bacterial or other microbiological growth, toxic formation, deterioration or contamination of the processed product. This will require careful monitoring of such processing operations as ozonation, distillation, etc. to ensure that mechanical breakdowns, time delays, temperature fluctuation and other factors do not contribute to the decomposition or contamination of the water being bottled. The filler reservoir shall be kept covered at all times, and the inlet so designed as to prevent entrance of condensation.

2. Microbiological, Chemical, and Other Testing Procedures

Microbiological, chemical, physical or other material testing procedures shall be utilized where necessary to identify contamination or sanitation failures, and all bottled water that has become contaminated shall be rejected.

According to current "Standard Methods," the microbiological condition of the bottled water operation shall be evaluated by the continuing collection and analysis of in-process water samples as well as the finished product water samples, in accordance with current government standards. Bacterial testing requirements for finished product shall be based upon the number of units produced monthly. The number, types and frequency of samples shall be based on the unit package concept regardless of the gallonage produced. Tests should be performed by laboratories whose methods and technical competence are recognized by the governmental agency having jurisdiction. A minimum of five samples per month shall be examined for each type of bottled water product. Source water obtained from other than a public water system shall be tested for bacteria at least once each week. At least once every three months, a bacteriological swab and/or rinse count should be made from at least four containers and closures selected just prior to filling and sealing. Three of the four samples should not exceed more than one bacterium per ml of capacity or one colony per square centimeter of surface area, and should be free of coliform organisms.

Chemical, physical and radiological testing shall be performed annually on all product waters to ensure compliance with regulations for constituents of drinking water, as prescribed by current FDA Quality Standards for Bottled Water. Source water

shall be analyzed for chemical contaminants annually, and once every four years for radiological contaminants.

Storage and transportation of finished products should be under such conditions that will protect against undesirable deterioration of the product and the container.

B.) Sanitary Facilities and Controls

Each plant shall be equipped with adequate sanitary facilities and accommodations including, but not limited to, the following:

1.) Operations Water Supply

If different than product water, the operations water supply shall be sufficient for the purpose intended and shall be derived from an approved source. Any water that comes in contact with product surfaces shall be safe, of adequate sanitary quality, at a suitable temperature and under adequate pressure. This shall be provided wherever processing, cleaning of equipment, utensils, or containers or employee facilities are required.

2.) Air Under Pressure

Whenever air under pressure is directed at a product contact surface, it shall be free of oil, dust, rust, excessive moisture, extraneous materials and odor, and shall otherwise comply with the 3-A Accepted Practices for Air Under Pressure.

3.) Disposal of Wastes

Disposal of sewage and other wastes shall be in a public sewage system, or in a manner in compliance with state and local plumbing codes.

4.) Plumbing

Plumbing shall comply with appropriate state and local plumbing codes and shall be of adequate size and design, properly installed, and maintained to:

- (a.) Carry sufficient quantities of water to required locations throughout the plant.
- (b.) Properly convey sewage and liquid disposable waste from the plant.
- (c.) Not constitute a source of contamination to products, water supplies, equipment or utensils, or create an unsanitary condition.

5.) Bathroom and Hand washing Facilities

Each plant shall provide its employees with adequate bathroom and associated hand washing facilities within the plant. The facilities shall be maintained in a sanitary condition and kept in good repair at all times. Doors to bathrooms shall be self-closing and shall not open directly into areas where product is exposed to airborne contamination, except where alternative means have been taken to prevent contamination, such as double doors, positive air-flow systems, etc.

Each bathroom shall be well lit and adequately ventilated to the outside. Signs shall be posted directing employees to wash hands with cleaning soap or detergents before leaving the bathroom. Storage of garments, food products, utensils, packaging and/or wrapping materials in bathrooms is not permitted.

6.) Hand washing Facilities

Hand washing facilities shall be provided with hot and cold, and/or warm running water, soap (excluding bar soap), and individual sanitary towels or a suitable drying device and, where appropriate, easily cleanable, closable waste receptacles. Fixtures and doors operated by elbow, knee or foot controls are recommended.

7.) Rubbish and Offal Disposal

Rubbish and any offal shall be so conveyed, stored and disposed of as to minimize the development of odor, prevent waste from becoming an attractant, harborage or breeding place for vermin, and prevent the contamination of bottled water product surface, ground surfaces and water supplies. All refuse other than broken glass, discarded caps, etc., shall be stored in covered, closable containers, which shall be impervious, leak-proof, easily cleanable, properly identified and readily accessible.

8.) Locker and Lunchrooms

Locker and lunchrooms shall be separate from plant operation, and be equipped with self-closing doors. The rooms shall be kept in a clean and sanitary condition. Refuse containers shall be provided as described in the above paragraph. Storage of

packaging and/or wrapping materials in locker rooms is forbidden.

C.) Sanitary Operations

Buildings, fixtures and other physical facilities of the plant shall be kept in good repair and shall be maintained in a sanitary condition. Floors in the bottling room shall be cleaned daily. Cleaning operations shall be conducted in such a manner as to minimize the danger of contamination of product and product control surfaces. Detergents, sanitizer and other supplies employed in cleaning and sanitizing procedures shall be free of significant microbiological contamination and shall be safe and effective for their intended uses. Only such toxic materials as are required to maintain sanitary conditions, for use in laboratory testing procedures, for plant equipment maintenance and operation, or in manufacturing or processing operation, shall be stored in the plant. These materials shall be identified and used only in such a manner and under conditions as will be safe for their intended use.

1.) Sanitizing Floors

a.) Materials – Calcium Hypochlorite (65% available chlorine); sprayer, Venturi type, 6- or 20- gallon capacity.

b) Preparation of Sanitizing Solution

20-gallon capacity sprayer – 433 grams calcium hypochlorite / 5 gallons water

6-gallon capacity – 130 grams calcium hypochlorite / 5 gallons water

When using other chlorine products, adjust to deliver 200 mg/l chlorine on the floor.

c) Procedure

Sanitize bottling room floor every night as a last step in the cleaning procedure as follows:

(1) After normal cleaning, fill sprayer holding jar to the mark with prepared chlorine solution and attach unit to the effluent end of a garden hose.

(2) Turn hose water tap on and adjust the flow to obtain a fine mist.

(3) Spray the entire floor with a fine mist of the chlorine spray

(4) Do not rinse the sanitized floor.

2.) Sanitation of Equipment and Utensils

All utensils and product contact surfaces of equipment shall be cleaned as frequently as necessary to prevent contamination of the product. Non-product contact surfaces of equipment used in the operation of bottled water plants should be cleaned as frequently as necessary to minimize the accumulation of dust, dirt and other debris. Single-service articles, such as utensils intended for one-time use (paper cups, paper towels, etc.) should be stored in appropriate containers and handled, dispensed, used and disposed of in a manner that prevents contamination of product or product contact surfaces. Where necessary to prevent the introduction of undesirable microbiological organisms and filth into products, all utensils and product contact surfaces of equipment used in the plant shall be cleaned and sanitized prior to such use, as well as following any interruption during which such utensils and contact surfaces may have become contaminated. Where such equipment and utensils are used in a continuous production operation, the contact surfaces of such equipment and utensils shall be cleaned and sanitized on a predetermined schedule using adequate methods for cleaning and sanitizing. Sanitizing agents shall be effective and safe under conditions of use. Any facility, procedure, machine or device may be acceptable for cleaning and sanitizing equipment and utensils if it is established that such facility, procedure, machine or device will routinely render equipment and utensils clean and provide adequate sanitizing treatment.

All multi-use containers shall be thoroughly cleaned and sanitized by washing with an effective cleansing agent water solution, having a temperature of not less than 120° F. A final rinsing of the inside, using

operation or product water, shall be used to remove traces of the sanitizing agent. The preferred method will be to clean by exposing all surfaces to a caustic solution, at a recommended temperature, using high velocity jet- or soaker-type bottle washers, followed by a thorough rinsing.

Containers shall be protected from contamination between washing and filling.

3.) Animals and Vermin Control

Effective measures shall be taken to exclude pests from the processing areas and to protect against the contamination of products in or on the premises by animals, birds and vermin, including but not limited to rodents and insects.

The use of insecticides and rodenticides is permitted only under such precautions and restrictions as will prevent the contamination of product or packaging materials with illegal residues. Only pesticides approved for use by the regulatory agency and/or registered with the Environmental Protection Agency (EPA) shall be used for insect and rodent control.

D.) Personnel

Plant management shall take all reasonable measures and precautions to ensure the following:

1.) Disease Control

No person affected by disease in a communicable form or while a carrier of such disease, or while affected by boils, sores, infected wounds or other abnormal sources of microbiological contamination, shall knowingly be permitted to work in a bottled water plant in any capacity in which there is the possibility of in-process or finished product water becoming contaminated by such person, or the disease being transmitted by such persons to other individuals.

2.) Cleanliness

All persons while working in direct contact with bottled water preparation or surfaces coming into contact therewith shall:

a.) Wear clean outer garments, maintain a high degree of personal cleanliness and conform to hygienic practices while on duty, to the extent necessary to prevent contamination of bottled water.

b.) Wash their hands thoroughly in an adequate hand washing facility before starting work, after each absence from the work station, and at any other time when the hands may have become soiled or contaminated. Hands are to be sanitized at frequent intervals by dipping hands in sanitizing solution or by using a sponge saturated with an approved sanitizing solution at capping, packing and faucet installation stations. An approved sanitizing solution may be prepared in the following manner:

(1) Materials – Oakite #1 or equivalent product; sponge - household type.

(2) Preparation of Sanitizing Solution – add 4.6 ml Oakite #1 to 5 gallons purified water (makes 50 mg/l solution). For other sanitizers, follow the manufacturer's recommendations.

(3) Procedure

(a) Use the solution every 15 minutes, or more frequently as required at:

Capping – where caps are put on bottles by hand

Packing – where clean bottles are put into crates

Faucet Installation – where faucets are placed in dispensing reservoirs.

(b) Rinse hands in clean water and then wipe with a sponge saturated with the sanitizing solution.

(c) Keep the sponge moist and clean by dipping it in the solution.

(d) Change the solution when it appears dirty.

Remove all insecure jewelry and, during periods where the process is manipulated by hand, remove from hands any jewelry that cannot be adequately sanitized.

If gloves are used, maintain them in an intact, clean and sanitary condition. Such gloves should be of an

impermeable material except where their usage will be inappropriate or incompatible with the work involved.

Wear hairnets, headbands, caps or other effective hair restraints.

Do not store clothing or other personal belongings, eat food or drink beverages, or use tobacco in any form in areas where the bottled water product is exposed, or in areas used for washing equipment or utensils.

Take any other necessary precautions to prevent contamination of the product with microorganisms or foreign substances including, but not limited to, perspiration, hair, cosmetics, tobacco, chemicals and other medicants.

3.) Education and Training

Personnel responsible for identifying sanitation failures or product contamination should have sufficient background education or experience, or combination thereof, to provide a level of competency necessary for overseeing the production of clean and safe bottled water. Handlers and supervisors shall receive appropriate training in proper operational techniques and bottled water protection principles, and should be cognizant of the danger of poor personal hygiene and unsanitary practices.

4.) Supervision

Responsibility for assuring compliance by all personnel with all requirements for this section shall be clearly assigned to competent supervisory personnel who shall have received sufficient continuing education for this purpose.

E.) Equipment for Collection, Storage and Processing of Water

The design, construction and use of such equipment and utensils shall preclude the adulteration of bottled water with lubricants, fuel, metal fragments, contaminated water or any other contaminants. All equipment should be so installed and maintained as to facilitate the cleaning of the equipment and all adjacent spaces.

1.) Suitability

All plant equipment and utensils should be suitable for their intended use. This includes all collection and storage tanks, piping, filling equipment, bottle washers, cappers, valves and other equipment which may be used to store, handle, package, or transport water.

2.) Design

Equipment and utensils should be designed and of such materials and workmanship as to be adequately cleanable, and shall be constructed of non-toxic, non-absorbent material which will withstand sanitation and which will not impart flavors, colors or odors to the bottled water. Tanks will be designed to be tightly closed to exclude all foreign matter, and will be vented through approved filters.

3.) Maintenance

All plant equipment shall be inspected, maintained, cleaned and sanitized according to the following requirements:

a) All storage tanks shall be inspected and/or tested with sufficient frequency to verify their sanitary condition and shall be kept free of scale, evidence of oxidation and residue. Presence of residue on tank walls or linings is sufficient evidence of the need for immediate cleaning and sanitizing. All storage or holding tanks shall be cleaned and sanitized with one of the following methods:

- (1) Chlorinated water at 100 mg/l residual chlorine for a minimum of 5 minutes.
- (2) Spray wet surfaces as described above. This is to be used on surfaces that are not reached by the above soaking treatment.
- (3) Satisfactory results may be obtained by the use of other bactericides such as organic chlorine compounds and bactericidal agents containing iodine or bromine, when used in accordance with accepted practices.
- (4) Flowing steam for not less than one minute, followed by flushing with product water. This may be used only in a closed system.

(5) Product water at a temperature sufficient to heat equipment surfaces to 180° F.

(6) 0.1 mg/l ozone water solution for not less than 10 minutes contact time.

b.) All product pipelines between storage tanks and fillers, and fillers themselves, shall be kept free of scale, evidence of oxidation and residue, and shall be sanitized on a daily basis as described in the above paragraph, except as follows: The continuous circulation of at least 0.1 mg/l ozonated water will fulfill the requirements for the sanitizing of product pipelines.

c.) Cappers – shall be kept free of residue and sanitized on a daily basis.

d) Valves – There shall be no cross connections between the finished product water lines and any other water pipelines, for example, the operations water.

e) Other equipment – Ozone mixing tubes and equipment and other equipment shall be inspected, disassembled if necessary, cleaned and sanitized as described in the *Maintenance* section, except as follows:

(1) Hoppers – Shall be kept covered, free of residue; contact surfaces shall be sanitized on a daily basis.

(2) Bottle washing equipment – Shall be kept free of paper residue and substances which may interfere with the proper operation of jets. Internal sprays shall be checked on a daily basis to ensure proper timing and adequate washing of bottles.

F. Filler Room Cleaning

When filling is completed on a daily basis, there should be no dust, grease or oil film on the exteriors of the processing equipment. In addition, any windows or window sills should be cleaned daily. If the light fixtures in the room collect dust, they should be cleaned daily.

At the finish of bottling daily, bottle caps must be removed from the capper, cap bowl and bin and put into a sealed container. The operators of the equipment should touch the caps only with cleaned hands that have been sanitized with a disinfectant.

Daily

a) The room should be swept and dusted prior to beginning the bottling operation.

b) Remove all unnecessary items, such as bottle crates or extra corrugated cartons.

c) Using a detergent solution, wash frames on fillers and capper. Rinse with product water.

d) Using a detergent solution, scrub the entire floor with a nylon brush and rinse with fresh water.

e) Clean the floor drain(s).

f) Clean any windows and window sills inside and outside of the filler room

g) Using a damp cloth, wipe off electrical panels and all other surfaces. Be sure the top of the filler, filler nozzle hoses, air hoses, etc., have been wiped daily. When a conveyor line and/or a vibrating cap bowl are in operation, the shaking and vibration are very capable of freeing any dust on the surfaces of the bottling equipment. All surfaces must be kept clean.

Less Frequent Cleaning Items (but Scheduled)

a) Clean louvers on air vents.

b) Wash walls with cleaner solution.

c) Clean stains from the floor with necessary equipment (Pumice stone?).

3. Filler Room Sanitation

Chlorine solution deteriorates synthetic sponges rapidly. Quaternary ammonium compound (quat) solutions will allow certain bacteria to grow in semi-soiled sponges if the sponges are not dried rapidly. Pronounced decreases of bacteria counts from filler heads following sanitation with quat solutions have

been found when a new synthetic sponge was used each day.

Filler room sanitation should be carried out just prior to the start of bottling. Bottling lines and interiors of filler nozzles may be sanitized with ozonated water of 0.1 mg/l, or preferably greater than 0.35 mg/l. A chlorine solution of about 50 mg/l may be used. There are two advantages to using ozone. One is that rinsing is not necessary; the other benefit is that chlorine can be hard on stainless steel surfaces.

The following pieces of equipment require daily sponge sanitation of their surfaces:

- a) Filler nozzle exteriors, insides of filler tubes should be cleaned with a suitable brush
- b) Splash shields
- c) Bottle positioning clamps

d) Cap bin

e) Cap bowl

f) Cap chute

A "quat" solution of 200 - 400 mg/l or a chlorine solution of 200 mg/l is satisfactory.

Again, new sponges are required daily, or else the sponge must be dried rapidly and completely after each use. A technique for sponging the inside of a cap chute is that of twisting an insulated electrical wire around the middle of the sponge and using a short length of wire to pull the sanitizing sponge along next to the cap chute.

The quat or other sanitizing solution needs to be rinsed only from the splash shield(s). Rinsing should be done just as the bottling line is being started.

Plant Operation Guidelines

Packaging of the Distilled Water

Packaging of product water provides the final safeguard of the water's quality. Packaging includes container handling and closures, bottle sanitation, bottle washing and filling, and production date-coding. Proper handling procedures and records are essential to eliminate contamination of the distilled water and to demonstrate to regulatory authorities and the public that the distilled water is safe, sanitary and of the highest quality.

1. Closures (Caps)

Closures are to be non-reusable and made of materials that comply with FDA regulations and guidelines for food contact. As purchased, closures are typically supplied in a sanitary condition. Closures must be stored in a sanitary manner. Special precautions must be taken to protect opened containers of closures from dust, dirt or other sources of contamination.

2. One-Way Containers (Bottles)

One-way containers must be made of materials that comply with FDA guidelines for food contact. As purchased, one-way containers may be in a sanitary condition. Empty containers must be stored in a sanitary manner. Precautions must be made to preclude open containers from becoming contaminated prior to filling. For example, a cover must be provided over conveyors up to the filler. You should consider rinsing the containers prior to filling.

3. Returnable Containers (Bottles)

Special care must be taken to ensure the cleanliness and sanitation of returnable containers. This is the only area in the entire product cycle for bottled water where an article must be handled and sanitized after having been exposed to hundreds of potentially

undesirable situations. As a result, it is essential that bottles be screened for contamination with foreign substances and thoroughly cleaned and sanitized.

Inspection of Returnable Bottles

The BW150 Washer is one of the highest quality washers available anywhere. However, it can't make an imperfect bottle perfect once again. Prior to the washing process, every bottle requires a thorough inspection for foreign objects, cracks or foreign substances such as petroleum products or substances that cannot be effectively removed by the washer. The operator(s) of the washer should be trained to use the "sniff" test prior to placing each bottle in the washer. This simple yet effective test should identify any bottles that may have contained gasoline, kerosene or other petroleum products.

If a bottle is found to be "substandard," the bottle should be removed from service prior to entering the washer. Bottles with cracks or evidence of solvents or petroleum products should be destroyed. There is no known method of removing petroleum products from polycarbonate bottles. The bottles should be marked or rendered unfit for use by puncturing the bottom.

Washing Bottles

In order to make sure the washer is fulfilling the requirements of providing a clean, sanitary container, certain guidelines and regulations have been established which assist you in accomplishing your objective. The BW150 has been designed to meet all of these guidelines.

Wash Cycle

All multi-use bottles shall be thoroughly cleaned by washing with an effective cleansing agent water solution at a minimum temperature of 120° F for not

less than one minute when using high-pressure nozzles.

- **Sanitize Cycle**

To effectively clean and sanitize, expose all surfaces to not less than a 2-1/2% caustic solution for not less than one minute.

- **Final Rinse Cycle**

A final rinsing of the inside, using operations water or product water, shall be used to remove traces of sanitizing agent.

Tests and Records

In order to meet the guidelines outlined above, the operator must make accurate measurement of detergent and sanitizing solutions. The tests are fully outlined in the TESTING section of this manual (See Chapter 4). The results should be noted on the Daily Maintenance Log. A copy of the log needs to be sent to Norland on a monthly basis. The original needs to be retained for your records.

Washer Maintenance

Full details of washer maintenance are explained in the BW150 Washer manual. In general, the washer interiors and nozzles should be checked to ensure proper alignment and flow of water. The interior of the washer should be cleaned daily. The operator will want to make sure the lighting above the

BW150 is adequate in order to properly inspect the bottles prior to and after the washing process.

Bottle Filling

The bottling room of your facility should be prepared so that, when freshly sanitized bottles and sterile product water are exposed to the air or to contact with filler tubes, guide rails, cap seating mechanism, etc., recontamination of the water does not occur.

There seems little doubt that anyone who has dealt with bottling room sanitation has thought: "Why go through all of this cleaning and sanitation when the ozone is going to kill all the microorganisms anyway?" Some of the answers are:

- Cleaning bottles and bottling equipment of residues of dirt and bacteria and keeping the bottling room air as free as possible of dust reduces the work required of the ozone. Furthermore, our customers deserve and expect water free from dust and other dirt.
- Those concerned with food plant sanitation have discovered, over the past 80 years or more, that products from clean plants are superior to those from dirty plants.

Labeling and Coding of Products

A label is a printed graphic or other matter attached to the immediate container. When regulations require that certain information must appear on the “label,” it means that it must appear on the printed display that is attached to the container itself.

The term “labeling,” or “label,” includes the actual label, but also refers to all written, printed or graphic matter accompanying a product for sale and covers any display of such matter on the immediate container, no matter how it is affixed.

The term “accompany” includes not only written material that physically accompanies the article during shipment in interstate commerce, but also material that has been shipped separately and months apart from the actual container, which is used or displayed at the point of sale.

Federal Food, Drug and Cosmetic Act

A food (including bottled water) shall be deemed misbranded:

1. If its labeling is false or misleading in any particular matter.
2. If it is offered for sale under the name of another food.
3. If it is an imitation of another food, unless it bears in type or uniform size and prominence the word “imitation” and, immediately thereafter, the name of the food imitated.
4. If its container is so made, formed or filled as to be misleading.
5. If in package form unless it bears a label containing:

- a) The name and place of business of the manufacturer, packer or distributor; and
 - b) An accurate statement of the quantity of the contents in terms of weight or measure.
6. If any work, statement or other information required by or under authority of this Act to appear on the label or labeling, is not predominantly placed thereon with such conspicuousness as compared with other words, statements, designs or devices in the labeling and in such terms as to render it likely to be read and understood by the ordinary individual under the customer conditions of purchase and use.
7. Unless its label bears:
- a) The common or usual name of the food, if any there be,
 - b) in case it is fabricated from two or more ingredients, the common or usual name of each such ingredient, except that spices, flavorings and colorings other than those sold as such, may be designated as spices, flavorings and colorings without naming each. Bottled water has a standard of identity and as such, if minerals have been added for taste, a qualifying statement that those minerals have been added in nutritionally insignificant amounts as part of the ingredient statement is required.
8. If it purports to be or is represented for special dietary uses, unless its label bears such information concerning its vitamin, mineral and other dietary properties as the secretary determines to be, and by regulations prescribed as necessary in order to fully inform purchasers as to its value for such uses.

Nutrition Labeling

Bottled water products are required to carry a nutrition label if at least one of the following two criteria are met:

1. The product carries a sodium claim, either on the label or in advertising (i.e., sodium-free).
2. The product carries significant levels of essential nutrients (i.e. calcium, magnesium).

In the event that nutrition labeling is required due to one of the above criteria, the panel must appear on the principle display panel as follows:

Nutrition Facts	
Serving Size 12 oz (360 ml)	
<hr/>	
Amount Per Serving	
Calories	0
<hr/>	
	% of Daily Volume*
Total Fat 0 g	0%
Sodium 0 mg	0%
Total Carbohydrate 0 g	0%
Protein 0 g	0%
<hr/>	
Not a significant source of calories from fat, saturated fat, cholesterol, dietary fiber, sugars, vitamin A, vitamin C, calcium and iron	
* Percent Daily Values are based on a 2,000 calorie diet	

If nutrition labeling is mandatory (that is, if it contains a sodium claim or presence of other nutrients), the panel may be displayed as above. However, the “Not a significant source of calories from fat, saturated fat, cholesterol, dietary fiber, sugars, vitamin A, vitamin C, calcium and iron” statement does not need to be included.

For returnable bottles, nutrition labeling is not allowed on the caps. However, whether required or mandatory, the nutrition information may be

provided either directly on the container or through alternate means, such as on a bill of lading or invoice, which must be provided with each statement. When considering the use of alternate means, firms must notify the FDA (in writing) of their intention to use alternate means. In their letter, they must address the FDA’s concern as identified under the Agency’s request for exemption under CFR Part 101 (g)(9).

Principle Display Panel

The principle display panel is defined as the part of a label most likely to be displayed, shown or examined at the retail sale. This panel shall accommodate all mandatory copy. Packages with alternate principle display panels or two primary faces must have duplicate mandatory copy on each panel.

Rectangular Package

One entire side can be considered to be the principle display panel. Bags forming sides by virtue of the gussets would be considered rectangular, and the width of the face times the height of the product would be considered the face area.

Cylinder or Nearly Cylindrical Package

The principle display panel is described as 40% of the circumference times the height of the container. Excluded from these calculations are flanges, shoulders and necks of jars and bottles.

Flat Package

The principle display panel consists of one entire side.

Miscellaneous Shaped Packages

Principle display panel determined to be 40% of the total surface of the package. This would include such package shapes as spheres and cones.

Identity Labeling

The identity of the commodity must appear prominently in bold type on the principle display panel with other printed matter, generally parallel to the base of the package as it is displayed. The identity statement must consist of at least one of the following:

1. The product name as required by any applicable law or regulation
2. The common or usual name of the food
3. An appropriately descriptive term

Firm Name Labeling

The name and place of business shall be conspicuously specified on the label, not necessarily the principle display panel, using the actual corporate name, and may be followed or preceded by the particular division. When the name is different from the manufacturer or the food, a qualifying statement such as “Manufactured for . . . ,” “Packaged by . . . ,” “Distributed by . . . ,” must be used. The statement of the place of business shall include the city, state and zip code. The street address must be added if the place of business is not listed in a telephone directory.

Quantity of Contents Labeling

The net quantity of contents in terms of weight, measure or numerical count must appear on the principle display panel and on all alternate principle display panels. A combination of the count and weight must appear if the count does not give adequate information. Fractions or decimals may be used in their lowest form. The declaration shall be in legible type, as a distinct item and in contrast to other matter on the package. The declaration must appear within the bottom 30% of the panel, generally parallel to the base. The 30% requirement does not apply to packages having 5 square inches or less of principle display panel. It shall be separated from all other printed information above and below a space equal to the height of the letters used, and a space twice the width of the letter “N” on either side of the declaration. No qualifying statement can be used such as “jumbo.”

Drinking water, when packaged in glass or plastic containers of half pint, 1 pint, 1 quart, half gallon and 1 gallon capacities, is exempt from the placement requirement that the declaration of net contents be located within the bottom 30% of the principle display panel, provided that other required label information is conspicuously displayed on the cap or outside the closure, and the required net quantity of contents declaration is conspicuously

blown, formed or molded into or permanently applied to that part of the glass or plastic container that is at or above the shoulder of the container.

Size of Quantity Statement

Letters used in the statement must be no more than three times as high as they are wide. Ratio of letter height to size of package is as follows:

- 1.) Not less than 1/16" in height on packages with a principle display panel of 5 sq. inches or less.
- 2.) Not less than 1/8" in height on packages with a principle display panel of more than 5, but not more than 25, sq. inches.
- 3.) Not less than 3/16" in height on packages with a principle display panel of more than 25, but not more than 100, sq. inches.
- 4.) Not less than 1/4" in height on packages with a principle display panel of more than 100 sq. inches.
- 5.) Not less than 1/2" in height on packages with a principle display panel of more than 400 sq. inches.

The letter height pertains to upper case. If upper and lower case are used, the lower case “o” shall meet the standard height. If a fraction is used, each component shall meet one-half of the minimum height standard.

Terminology of the “Declaration of Quantity” Statement

The declaration may appear in more than one line. Use of the terms “net” or “Net contents” is optional.

For quantities, the following abbreviations and no others can be used. Period and plural forms are optional.

Ounce.....oz.	Pint.....pt.
Gallongal.	Quart.....qt.
Fluid.....fl.	

On packages containing less than one gallon, the declaration shall be expressed in ounces, followed in parentheses by quarts and pints, with any remainder stated in ounces.

Example: A declaration of 1 quart shall be stated as "Net 32 fl. oz. (1 qt.)".

FDA

The FDA states briefly, that each unit package of bottled water produced shall be identified by a production code. This code shall identify a particular production run for the day on which the product was bottled. A record shall be kept showing the type of product and volume produced for that

day, and the distribution of the finished product to wholesale and retail outlets.

If a number of bottles are cased and the cases sold as single units, the cases themselves can be dated. However, if the case is used for shipping purposes only and the bottles are removed and sold individually, the code must be placed on each individual bottle.

The coding can be done on the caps or on the bottles. However, the ink should be of a type to resist smearing.

Role of Route Personnel

Route personnel play a vital role in maintaining high quality standards for bottled water. They have the final quality control check for every bottle of water and water dispenser delivered to customers. Therefore, it is extremely important that these critical employees be fully trained in fulfilling their role as inspectors of full bottles, empty bottles and water coolers.

A. Inspection of Bottles

In the field, incoming full or empty water containers must be inspected by the retail route personnel for evidence of any foreign matter or other defect such as:

- Cracks or chips
- Foreign objects or odors
- Gasoline, solvents, oils, etc.
- Perfume
- Any other liquid contaminant

A white tag or other suitable label shall be affixed to the shoulder or neck of any bottle obviously contaminated or suspected of being contaminated.

The training of route personnel should include the following sessions:

1. General

Use care in placement of coolers and bottles. Keep both in clean area: do not expose to gas, oil or solvents.

Mark as defective all bottles that DO contain or HAVE contained these substances. Contaminated bottles cannot be re-used!

Assistance of route sales personnel is vital in protecting the bottle, as well as customers, from foreign substances that may find their way into the bottle. Make it a point to stress to customers that NO substance other than water is EVER to be put in the bottles.

As the representative in the field, route sales personnel are the FIRST and FINAL line of protection. If anything suspicious is noticed about the empties picked up, i.e., foreign matter or liquid, mark the bottle with an “unserviceable” label. Take that extra second or two to check each empty before placing it on the truck. When delivering, make sure nothing is in the water.

Repetition of these instructions should occur at different phases of the training.

2. Training in the Field

a) Installation of New Order

- (1) The route trainer should stress the importance of finding a clear area for the dispenser and finding a storage area for extra bottles that will keep them free of oil-based products, gas, oil, pesticides, etc.
- (2) The route trainer should inform the customer that no other substances will be introduced into the bottle.

b) Taking Full Bottle from the Truck

- (1) When pulling the bottle from the truck to deliver, check for foreign matter in the bottle before carrying it to the customer’s location.
- (2) If foreign substances are present, do not deliver the bottle.

- (3) Replace bottle on truck and attach an “unserviceable” tag.

c) Carrying Empty Bottle Back to Truck

- (1) Emphasize the need to return empty bottles.
- (2) Cover importance of looking for foreign matter or foreign liquids in bottles.
- (3) If substances are found, remove at once.
- (4) If liquid is something other than bottled water, bottle is to be tagged as unserviceable.
- (5) Sniff each bottle. If solvent or other odor is detected, the bottle is to be tagged as unserviceable.

B. Maintenance of Water Coolers

Route personnel should be trained in proper dispenser placement and bottle handling procedures to minimize possible contamination. These procedures should include:

1. When setting cooler:

- a) Inspect the cooler to make sure reconditioning has been adequately accomplished. Any problem coolers must be tagged and returned for reconditioning.
- b) Set the dispenser in a clean place away from potential contaminants, such as dust and dirt from open windows, organic vapors, grease, paint sprays, etc., the dispenser should also be placed away from direct sunlight or bright lights.
- c) Since great care was taken to deliver a sanitary bottle of water, it is important that the dispenser is of the same quality.

2. When placing bottle cooler:

- a) At each delivery, inspect the dispenser reservoir to be sure that it is clean. Otherwise, replace, tag and return for reconditioning.

- b) Inspect each bottle of water to be sure it is clean and has no defects. Tag and return any faulty bottles to the plant.
- c) Be sure to carry the bottle using a clean paper towel between your hands and the neck of the bottle. Always be sure your hands are clean when handling full bottles.
- d) Wipe the shoulder and neck of the bottle using a clean paper towel.
- e) Carefully remove the cap without touching the top of the bottle.
- f) Lift the bottle without touching the top, and place on the dispenser.
- g) The customer should receive information, preferably in written form, instructing them of the proper procedures to avoid inadvertent contamination of their water coolers.
- h) Some program of regular cooler sanitation should be included as part of the customer service program. This should include one or more of the following options:

OPTION A: Customer sanitizing of electric coolers

OPTION B: Field sanitizing of coolers with removable reservoir

OPTION C: Periodic sanitizing of coolers in field by route personnel

OPTION D: Periodic exchange of the cooler with a reconditioned, sanitized cooler on a regularly scheduled basis

OPTION E: Periodic exchange of the removable reservoir with a reconditioned, sanitized reservoir on a regularly-scheduled basis

Chapter 9

Cooler Sanitation

Bottled water coolers must be maintained in a sanitary condition to ensure that the high quality of your distilled water is not diminished after leaving your plant. To assure the integrity of the bottled water cooler, route personnel should be trained in proper cooler placement and proper bottle handling procedures to reduce possible contamination. It is important that, since great care was taken to produce a sanitary bottle of water, the cooler should be of the same high quality.

Customers should be educated as to the correct procedures when the cooler is initially placed and then periodically thereafter as required. In addition, they should be informed of the following items:

When storing coolers:

1. Avoid using bottle or cooler as shelf for plants or other objects.
2. Avoid using any types of sprays, mists or vapors around the cooler that could be absorbed by the water.
3. Keep area around cooler free of dust and dirt.

When placing new bottle on dispenser:

1. Wipe top of dispenser area around bottle with clean, damp paper towel.
2. Wipe top and neck of fresh bottle of water with clean, damp paper towel.
3. Remove empty bottle and replace with fresh bottle as quickly as possible.

4. Carefully open bottle and place on dispenser without touching the neck or top of the bottle.

Sanitation Program

A program of regular cooler sanitation is recommended as part of the customer service program

A sanitizing procedure is recommended for the customer to use on a regular basis (6-12 months is a recommended frequency). This applies to coolers with a non-removable reservoir, such as most electric coolers. The following is a suggested sanitation procedure. If you are using a cooler with a removable reservoir, follow the manufacturer's recommended sanitizing procedure.

1. Unplug the power cord from electrical outlet and let stand for a few minutes to reach room temperature.
2. Remove empty bottle. Drain reservoir by opening cold faucet until no more water flows.
3. Place a stopper such as a cork in the hole in the bottom of the cooler.
4. Prepare a bleach solution by adding one-half teaspoon of household bleach to one gallon of distilled water.
5. Add this solution to fill the reservoir about one-half full.
6. Wash reservoir thoroughly with this solution, covering all surfaces.

7. Let solution stand for a minimum of five minutes.
8. Drain solution through cold faucet.
9. Rinse reservoir thoroughly with distilled water several times, draining water through cold faucet. Continue rinsing until no chlorine taste remains.
10. Place new bottle on cooler and plug electrical cord into the electrical outlet.

Drip Tray (located under faucets)

1. Remove tray.
2. Remove screen and wash both tray and screen in mild detergent.
3. Rinse well in clean water, dry and replace on cooler.

Procedures for Sanitizing Coolers in Plant

Periodically, you may need to sanitize the coolers in your plant. This is especially true with coolers that have been installed at a customer's location and have been brought back into the plant. To sanitize coolers, the following is a recommended procedure.

A. Reservoirs

1. Preparation
 - a) Remove all foreign materials.
 - b) Remove valve and valve gaskets (clean separately).
 - c) Inspect reservoir for cracks or other damage.

2. Cleaning and Sanitizing

- a) With brush or sponge and the aid of cleaning agent, remove all visible soil. The polycarbonate bottle washing solution works well.
- b) Rinse thoroughly with clean water.
- c) Install clean valve (see "Valve" procedure below).
- d) Place in tub, tank or vat of a hypochlorite solution containing at least 100 mg/l available chlorine (1-1/4 ounces of 5-1/4% household bleach per 5 gallons of water) and soak for 1 minute.
- e) Empty reservoir, open valve.
- f) Drain upside down on table or rack in a protected area for at least 5 minutes.
- g) Wrap in clean plastic.

B. Valves

1. Preparation

- a.) Inspect parts for wear.
- b.) Disassemble leaking valves and broken faucets and repair. Discard worn, cut or hard washers.

2. Cleaning and Sanitizing

- a) Clean all parts with a suitable brush and cleaning agent.
- b) Rinse thoroughly in clean water.
- c) Air dry in a protected area.
- d) Reinstall clean valve in reservoir, using new washers if needed to avoid leakage.

Chapter 10

Product Recall Plan

The U.S. Food and Drug Administration (FDA) requires all bottled water companies to have a written recall plan in case products ever need to be withdrawn from the market. The regulations identify three classes of recall, each requiring different levels of action which vary with respect to:

- Depth of recall: whether it is necessary to recall to the wholesale, distribution, retail or consumer levels.
- Degree of public warning: whether it is necessary to issue a public warning to wholesalers, distributors, retailers or (via the media) to consumers.
- Effectiveness checks: the level of verification (0-100%) required to demonstrate that a defective product has been recalled.

A Class I recall involves a situation in which there is a reasonable probability that the product may cause illness or death. This most serious level generally requires recall to the consumer level, individual consumer notification via radio, TV and newspapers, and 100% effectiveness checks.

A Class II recall involves a situation in which the product may cause temporary or medically reversible illness, and where the probability of serious health consequences is remote. Requirements for this level are less clear-cut. Depending on the situation, this usually requires recall to the retail level, some possible public warning and some level of effectiveness checks. Actual requirements are usually negotiated with the FDA based on the facts in each situation.

A Class III recall involves a situation in which the product is not likely to cause illness. For example, this recall might involve foreign matter in bottles that does not result in a health hazard. This level of recall generally involves recall to the wholesale level, no public notification and no effectiveness checks.

A recall may be initiated by a firm or requested by the FDA. If the recall is firm-initiated and the product violates FDA standards, the FDA must be notified and provided with information regarding the nature and extent of the problem; an evaluation of potential risks; the proposed recall strategy; the proposed format for any public notification; and the name and telephone number of the company official to be contacted regarding the recall. The FDA will then assign a recall classification and recommend any changes in the proposed recall strategy. When the recall is FDA-requested, the bottled water company will receive from the agency a formal notification, which includes the nature of the violation, the recall classification, the recall strategy and any other appropriate instructions.

A recall plan includes:

- A list of those people who will be involved in the recall.
- The specific responsibilities of each of those involved.

- An outline of proposed strategies for different classes of recall. These strategies should include depth of recall, public warning requirements and level of effectiveness checks.

The recall plan depends on accurate date coding of the product and complete, accurate distribution records to identify defective product lots as well as where that product was shipped.

Suggested wording for a generic recall plan is provided below:

MODEL STATEMENT
OF RECALL PLAN
to be included in
QUALITY ASSURANCE PLANS

The (your company) Company maintains a recall plan that establishes strategy and specifies procedures to be followed when it becomes necessary to recall any lot or product from the marketplace.

The plan will be activated whenever a recall requirement arises, and will include the following elements:

(Your) Company Product Recall Program Structure

Product Recall Committee

(Your) Company's Product Recall Committee is composed of representatives of the various components of the company organization.

The following individuals are represented on the committee at corporate headquarters in (city):

President or CEO
Vice President Administration
Vice President Operations
Vice President Sales
Plant Manager(s)
Legal Counsel

For branch offices in (other cities), the following corporate and branch office individuals are represented in the product recall committee:

President or CEO
Vice President Administration
Vice President Operations
General Manager of the affected branch office
Legal Counsel

These individuals are responsible and authoritative representatives of general management, quality assurance, production, distribution / warehousing, marketing / sales, controller, public relations and legal counsel.

Product Recall Coordinator

In product recall situations, many things happen at the same time and information must be accumulated rapidly. Therefore, it is essential that there be central coordination of all recall activities as well as the events leading to a product recall. The president of (your) company has appointed (the coordinator) the company's recall coordinator. The recall coordinator is responsible for overseeing and coordinating the implementation of the

company's product recall, and assures that complete documentation of decisions and accomplishments is on file. He keeps the president informed at all stages of the recall.

The recall coordinator has the authority to call on the various components in the company for priority assistance in product investigations, in the recall proper and for disposition of any recalled product. The product recall coordinator shall have a working knowledge of FDA procedures and regulations.

Discovery of Questionable Product

Information that a product may be defective or otherwise unsatisfactory may come from many different sources. For example, customer complaints that exhibit a trend could trigger recall procedures. Complaints of a similar nature dealing with similarly coded product in a short period of time indicate a high probability of a particular problem. Since customer complaints are responded to individually, the person(s) handling the complaints must stay alert to patterns of similar complaints and keep the product recall coordinator informed. At other times, the first indication of a problem may arise from a production, quality assurance or route employee, a supplier, a wholesale customer or a regulatory agency. Any of the sources may cause the product recall coordinator to begin an investigation to determine if a recall is necessary.

Investigation of Potential Situations

Upon receipt of information indicating a reasonable likelihood of a problem or defect, the product recall coordinator implements (your) company's action plan by starting an investigation. This is accomplished by alerting the Product Recall Committee to the potential problem (product, code if used, bottle and cap type, nature of the defect, etc.). At this point, each member of the committee will concurrently perform various functions within his or her respective department.

1. Product Recall Coordinator

Shall initiate a product recall log to document all events, when they occur and the company's response to each. Also documents the product type, code if used, package, and date and time of discovery. Instructs vice president operations and plant managers (or general manager of a branch office) regarding a product "hold" situation if the problem appears to violate a regulation. Keeps the president advised of the status of the investigation.

2. Vice President Operations and Plant Managers

Shall investigate the problem thoroughly, but quickly.

- a) Collect and analyze samples of suspected product.
- b) Identify presence or absence of a real or potential problem or defect.
- c) Assess the significance of the problem or defect.
- d) Review original quality assurance laboratory records for indication of problem or defect, if applicable, which was not actually identified at time of production.
- e) Submit documentation of the investigative findings to the product recall coordinator.

3. Vice President Sales (or general manager at branch offices)

Shall determine if questionable product is under company control and if there are other complaints on the suspected product.

- a) Only if instructed by the Product Recall Coordinator, places suspect product on hold and if appropriate, advises supplier of suspect product and/or other water bottlers in company's market area who may have purchased the suspect product.
- b) Determines amount of suspected product still under company control and amount which may have been delivered to consumers.
- c) Determines feasibility of isolating product lots.

- d) Determines location of suspected product which may be on route trucks or which may have been delivered to consumers, where possible and appropriate.
- e) Documents and reports findings to product recall coordinator.

4. Plant Managers

Shall determine the time and amount of suspected product produced.

- a) Determine possibility of contamination of other products through equipment or package uses.
- b) Determine location of suspected product in wholesale trade, where possible and appropriate.
- c) Document and report findings to product recall coordinator.

Presentation of Investigative Findings

If a problem or defect is confirmed, a meeting of the Product Recall Committee shall be held. The Committee's task is to evaluate, based on the documented evidence, whether the product constitutes a threat to the health or safety of the consumer, or whether the product is one which presents no hazard to the consumer, but does not comply with (your) Company's specifications. In addition, the Committee shall recommend whether a recall should be initiated, and the appropriate recall strategy (depth of recall, regulatory agency classification, public warning, and effectiveness checks).

However, the final decision for product recalls, including decisions to contact government authorities, consumers and media rests with the president or in his absence, the (person's name) who has full decision-making authority in absence of the president. The product recall coordinator shall be the primary regulatory agency contact.

Hazard Conditions

In determining whether a product recall shall be initiated and which recall classification to follow, the circumstances surrounding the product in question must be evaluated to determine the degree of the hazard to the consumer. Factors considered shall include but not be limited to the following:

1. Whether the defect or problem is product / health or package / safety-oriented.
2. Whether illness or injury has already occurred from use of the product.
3. Whether various segments of the population, e.g., children, elderly, heart patients, etc., are at greater risk.
4. An assessment of the seriousness of any health or safety hazard.
5. An assessment of the likelihood of occurrence of the hazard.
6. An assessment of immediate or long-term consequences of the hazard.
7. In the case of a safety-oriented problem, any evidence indicating that one or more of the materials were defective.

FDA Product Retrieval Classifications

Based on this type of hazard analysis and with the advice of legal counsel, the recall shall be classified as one of the following three which, in part, will dictate the appropriate recall strategy.

Class I Recall

Reasonable probability that the use of the product will cause serious, adverse health consequences or death (for example, toxic substance contamination, such as caustic, insecticides, PCB's, etc.).

Class II Recall

Product may cause temporary or medically reversible adverse health consequences. Probability of serious adverse health consequences is remote (for example, excessive amount of fluoride, ammonia contamination, failure of ozonator, etc.).

Class III Recall

Product is not likely to cause adverse health consequences, but violates some specific food regulation (for example, short net weight, mislabeled, error in label or other minor things which make product subject to seizure).

FDA regulations require that the following factors be taken into account in determining appropriate recall strategy:

- 1.) Results of the health hazard evaluation.
- 2.) Ease in identifying the product.
- 3.) The degree to which the product's deficiency is obvious to the consumer.
- 4.) The degree to which the recalled product remains unused in the marketplace.
- 5.) Continued availability of essential products.

Detailed Recall Strategies

(Your) Company's recall strategy will vary depending on the classification of the recall. Hazardous situations require product retrievals from the most far-reaching levels of distribution (recall depth), public warnings or alerts, and effectiveness checks to assure violative products have been removed. The nature of less serious recalls may not warrant such an intensive strategy.

Class I Recall

1. Immediate and rapid recall of all affected product, from all levels of the distribution system down to and including the consumer level.
2. Notification of the FDA and pertinent state and local authorities.
3. Issuance of a public warning by means of the press, radio and/or television.
4. Follow-up on all distribution points for an effectiveness check of the completeness of the recall.

Class II Recall

1. Immediate and rapid recall of all affected product down to and including the consumer level.
2. Notify FDA and pertinent state and local authorities.
3. Evaluate the appropriateness of notifying the media with information concerning the recall.
4. Follow-up of various levels of distribution points for an effectiveness check of the completeness of the recall will be required, depending on the nature of the problem.

Class III Recall

1. Product is recalled down to the wholesale distribution level, unless circumstances warrant retrieval at the consumer level.
2. FDA requests to be notified immediately. State and local authorities may or may not require notification.
3. No media notification is required.

4. No effectiveness checks are required, but may be advisable.

Notification of Regulatory Agency

Once the decision to recall a product has been made, timely notification of the appropriate regulatory agency and (your company) insurance company is imperative. Again, only the designated person, (your company's) product recall coordinator, shall make these contacts. The product recall coordinator will be asked to provide:

1. Identity of the product involved.
2. Reason for the removal or correction, and the date and circumstances under which the product deficiency or possible deficiency was discovered.
3. Evaluation of the risk associated with the deficiency or possible deficiency.
4. Total amount of such product produced and/or the time span of the production.
5. Total amount of the product estimated to be in distribution channels.
6. Distribution information area, including the number of direct accounts and, where necessary, the identity of those products.
7. A copy of (your company's) actual proposed recall communication.
8. Proposed strategy for conducting recall.
9. The affected (your company's) plant's name and address.
10. Name and telephone number of (your company's) product recall coordinator who should be contacted concerning the recall. (After reviewing the submitted material, FDA will verify the class of the recall and its strategy or recommended appropriate changes).

If necessary, a news release shall be prepared describing the product, the nature of the hazard and any precautionary warning applicable to the consumer.

Departmental Responsibilities During Product Retrieval

Concurrently, the vice president sales will instigate actions to retrieve the recalled product; the vice president operations, with the assistance of the plant managers, shall ensure sufficient supply of acceptable replacement product; and the product recall coordinator shall maintain documentation of effectiveness of the recalled product.

Vice President Sales and Route Salesmen

1. Inform (your company's) employees and consumers of the recall as appropriate and consistent with the product recall coordinator's news release.
2. Notify food broker, warehouses and distribution centers to:
 - a) Locate product being recalled.
 - b) Halt all shipments of recalled product.
 - c) Isolate and positively identify or label the recalled product so that it is distinguishable from acceptable product until further instructions concerning its disposition are received.
3. Notify supplier of suspect product and/or other water bottlers in (your company's) market area who may have purchased the product to:
 - a) Remove the product from the specified levels of distribution.

- b) Isolate and positively identify or label the recalled product so that it is distinguishable from acceptable product until further instructions concerning its disposition are received.
 - c) Carefully document recall expenses to all reimbursement by the party responsible for recalling incident.
4. If recall from consumer level is warranted, instruct route personnel to:
- a) Inspect all product present at locations serviced and remove if recalled product found.
 - b) Replace all product removed from recall with acceptable product if possible; otherwise, issue credit or refunds.
 - c) Segregate recalled product in truck.
 - d) Transport recalled product to central collection point.
 - e) Turn in to route supervisor a daily report showing the amount of product removed and the method of reimbursement (replacement, credit, refund) for each location visited.
5. Designate collection centers as warranted by the strategy for the class of recall for:
- a. Product removed from (your company's) and (your company's) distributor warehouses.
 - b. Product removed from wholesale customer warehouses.
 - c. Product returned by consumers. Local collection points may be other than the (your company's) plant. Consumers should be given the option for refund or exchange.

(Your Company) Plant Managers

- 1. Ensure that sufficient supply of acceptable product is available.
- 2. Correct the cause of the problem or defect and take all steps necessary to prevent its recurrence.
- 3. Provide or make suitable arrangements for the equipment and/or personnel to be used in the disposition of the recalled product. Disposition may include sorting good product from bad, correcting incorrect labels, destroying recalled product (and disposal in accordance with applicable regulations) or other remedies.

Product Recall Coordinator

- 1. Maintain records to verify the extent to which the recalled product has been recovered.
- 2. Conduct or arrange for effectiveness checks (See FDA's Methods for Conducting Recall Effectiveness Checks) to verify that appropriate actions have been taken at the recall depth specified in the recall strategy.
- 3. Recommend a method of disposition for the recalled product. The most cost-effective method of correcting a problem is to recoup and/or rework as much good product as is safe and economically feasible. Determine appropriate methods of destruction for the remainder.

Vice President Administration

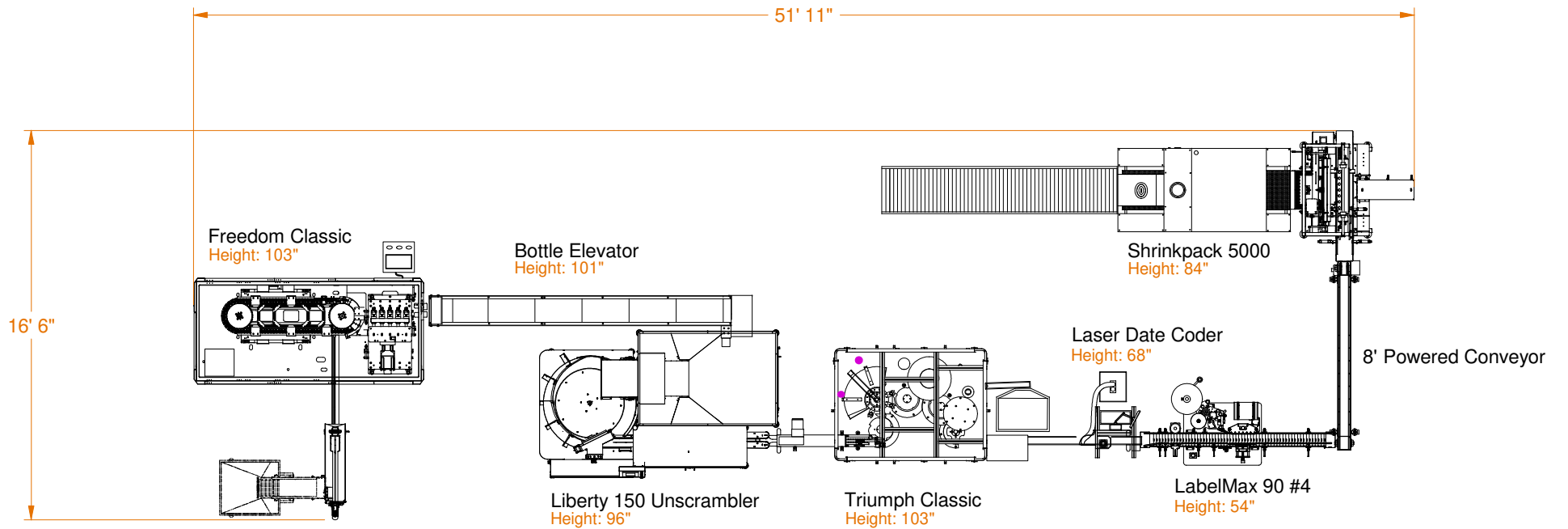
- 1. Establish a system to record the costs of the recall campaign. The costs will include:
 - a) Credits issued.
 - b) Refunds given.
 - c) Value of replacement product issued.
 - d) Handling costs at collection centers.
 - e) Cost to produce or obtain replacement products.
 - f) Additional equipment expense.
 - g) Overtime expense.

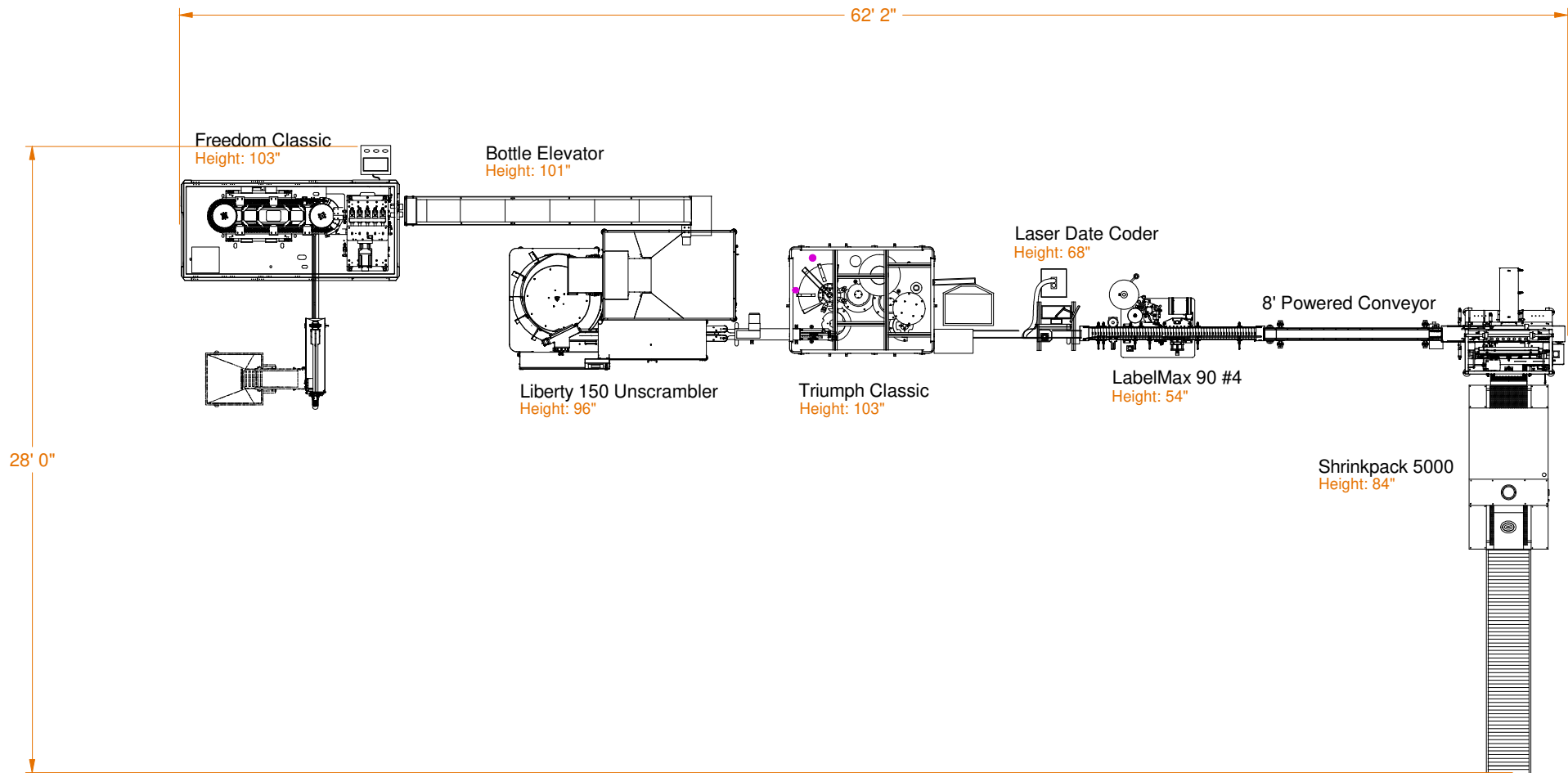
- h) Additional personnel expense.
- i) Storage space expense.
- j) Costs incurred by other water bottlers who had purchased the product.
- k) Retrieval, transportation and destruction expenses.
- l) Cost of public warnings.

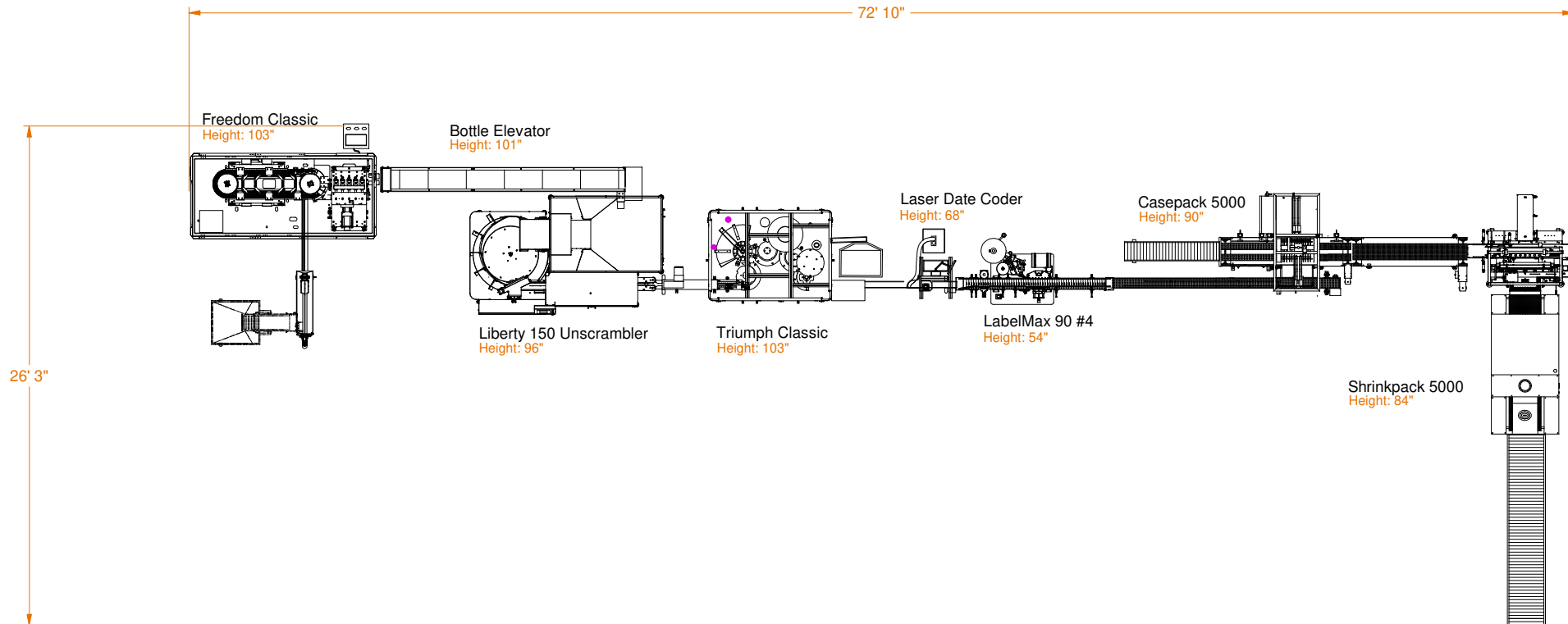
Concluding the Recall

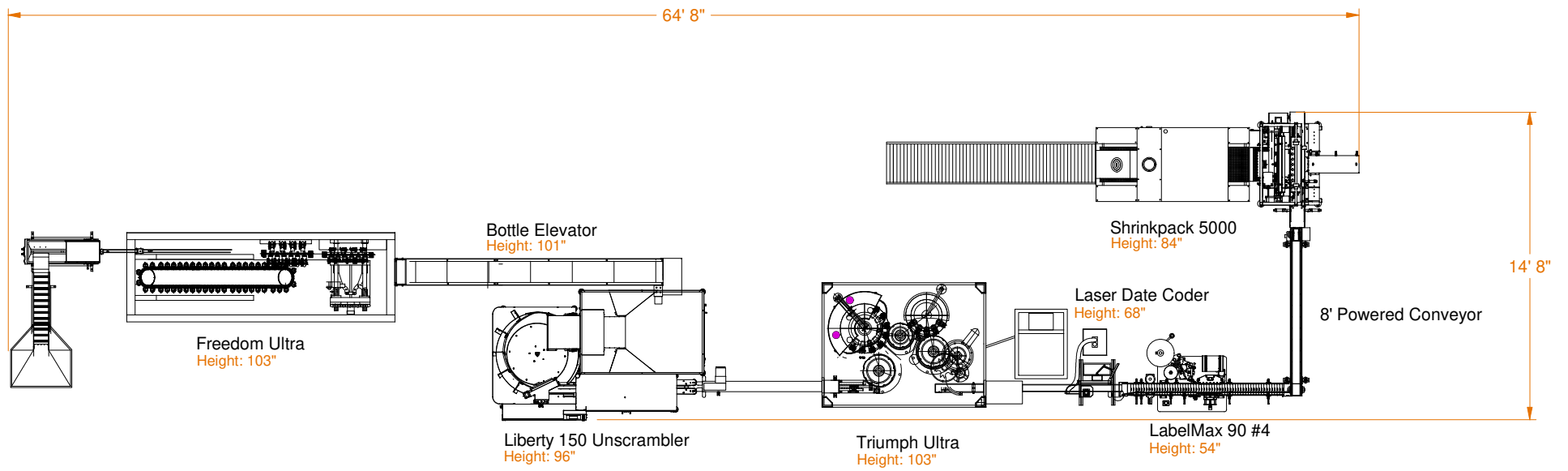
Notification of the regulatory agency officials that the recall has been completed will be determined by the recall strategy. Class I, II or III recalls involve close contact with the regulatory agency and, for that reason, notification is advisable and probably will be required. If a public warning or press release was issued, final release stating that the recall has been completed is warranted. The statement may be made jointly with the FDA statement that the recall has been completed.

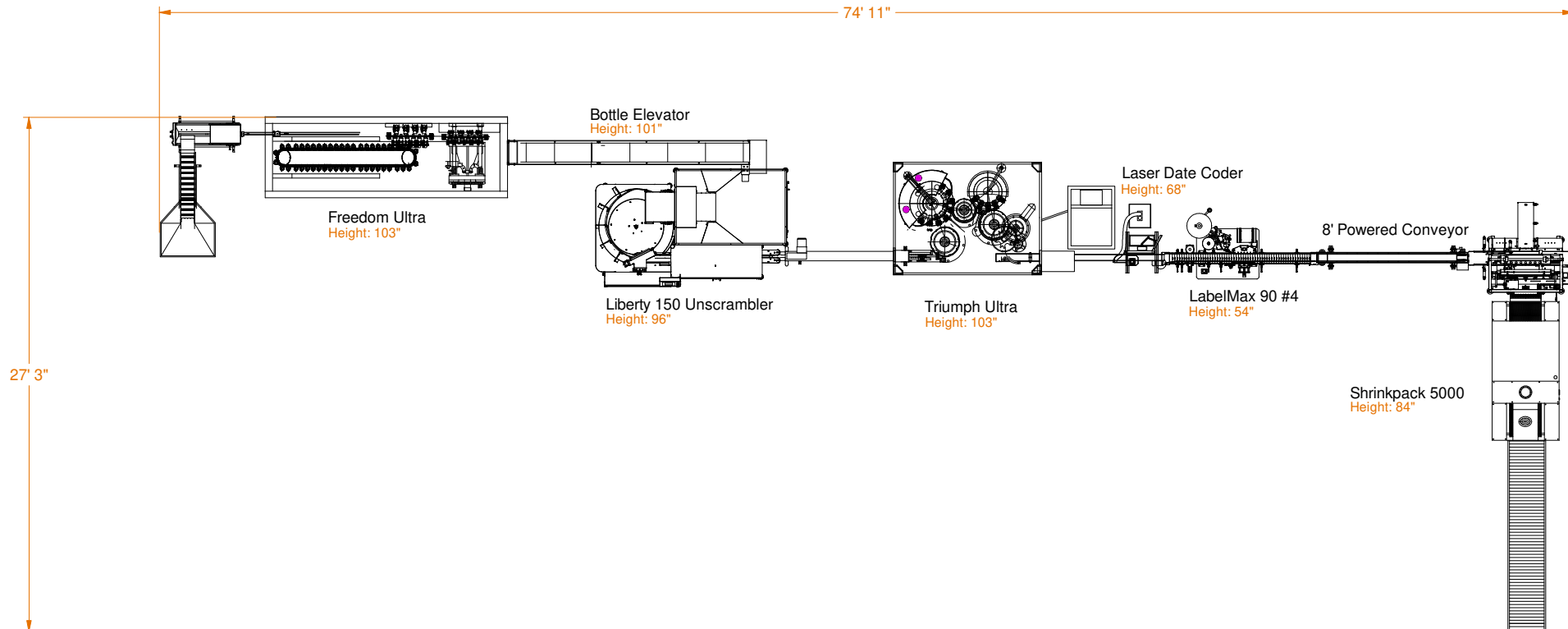
The recall coordinator shall prepare a final written report to the president. This report shall detail the product recall: source of the complaint which led to the recall; opinion on the cause of the problem or defect; depth of the recall; effectiveness checks; costs; methods of disposition used; and suggestions and/or changes made to prevent recurrence of the incident.

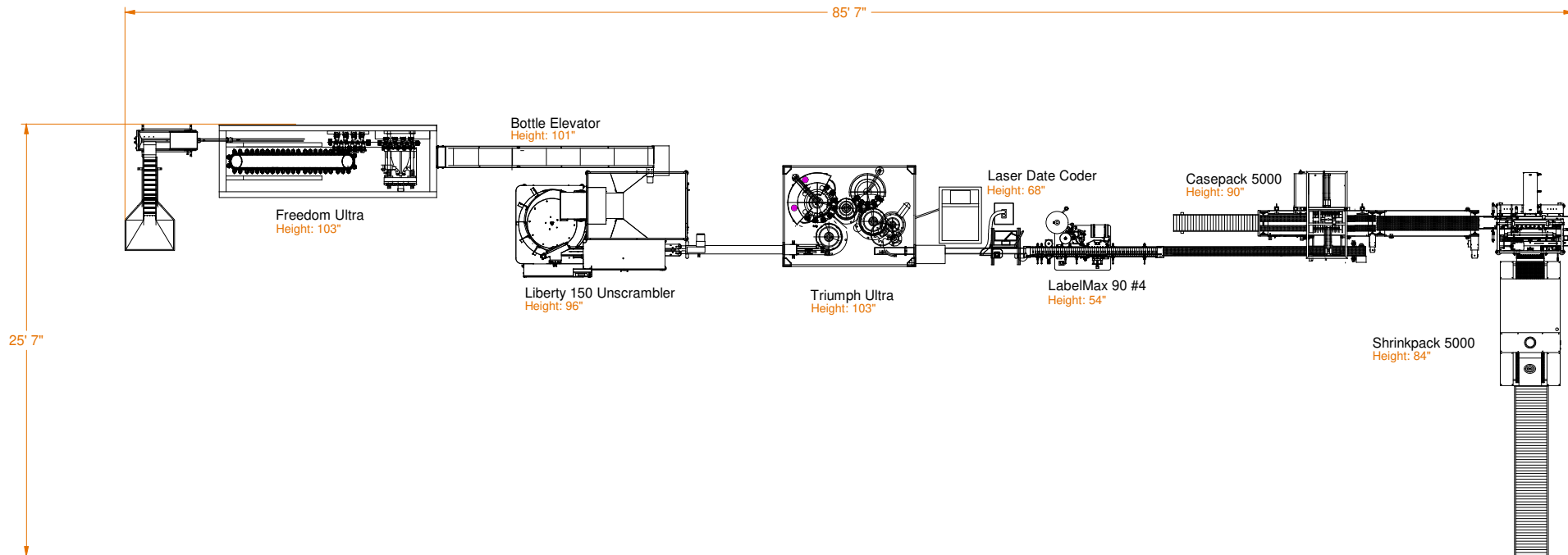


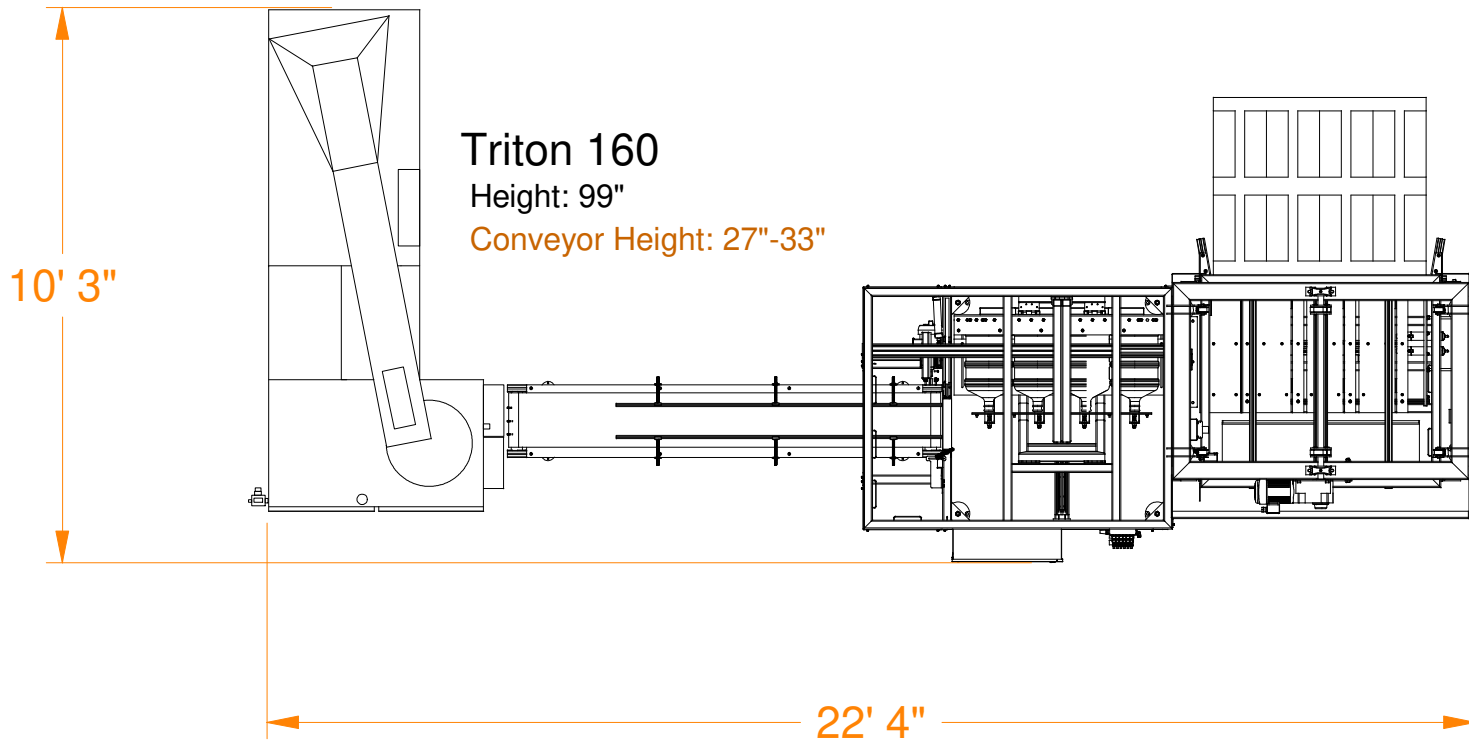






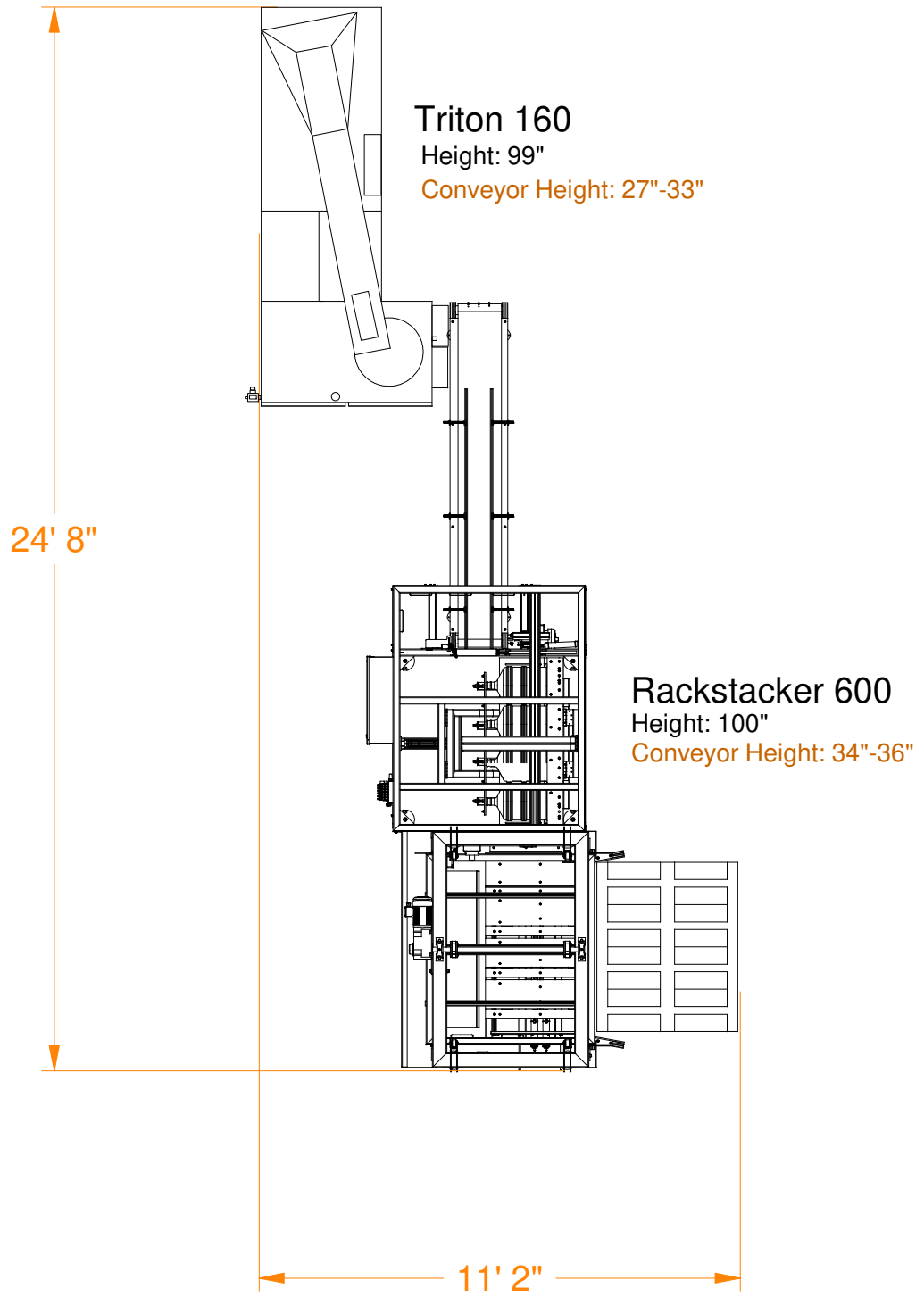


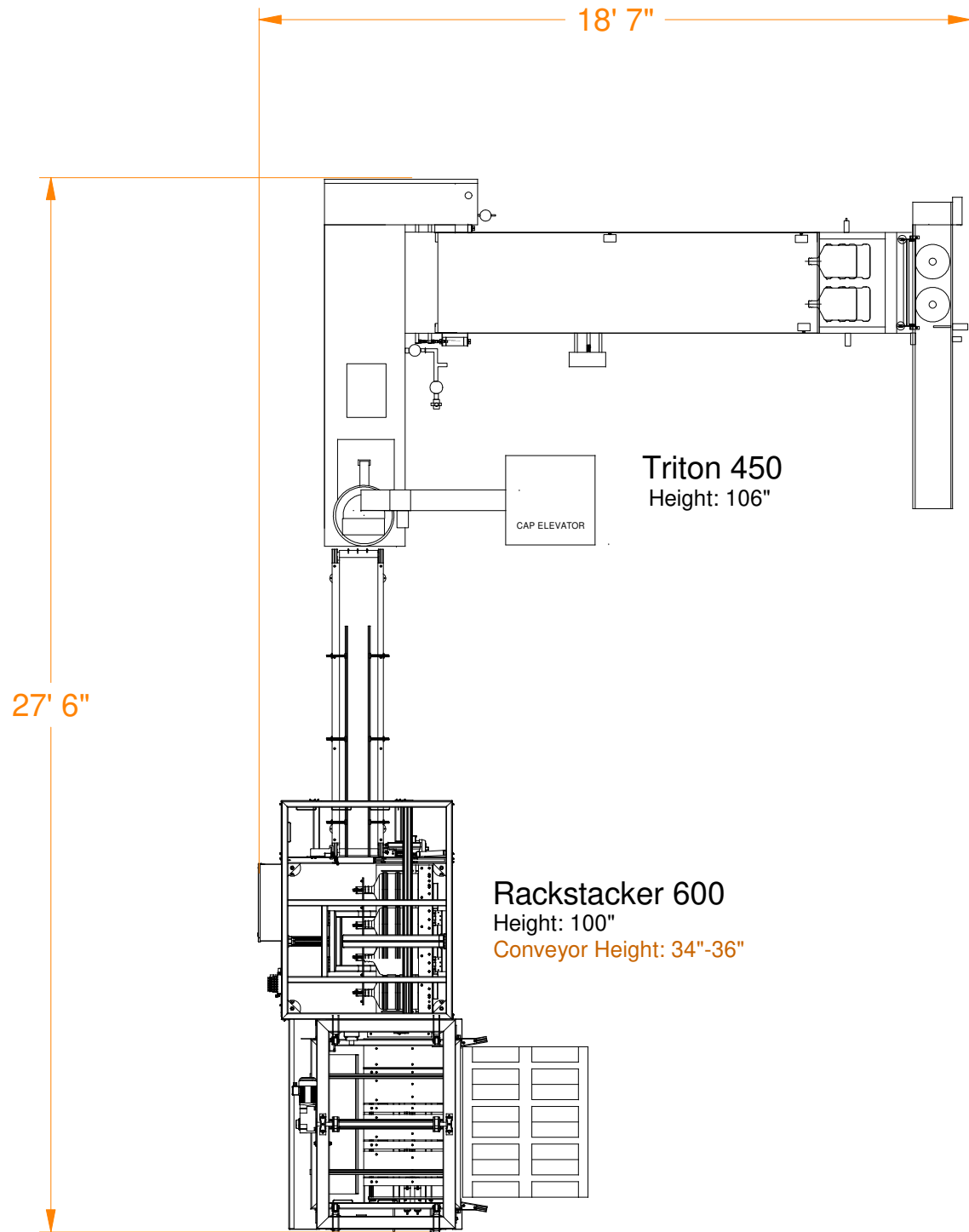


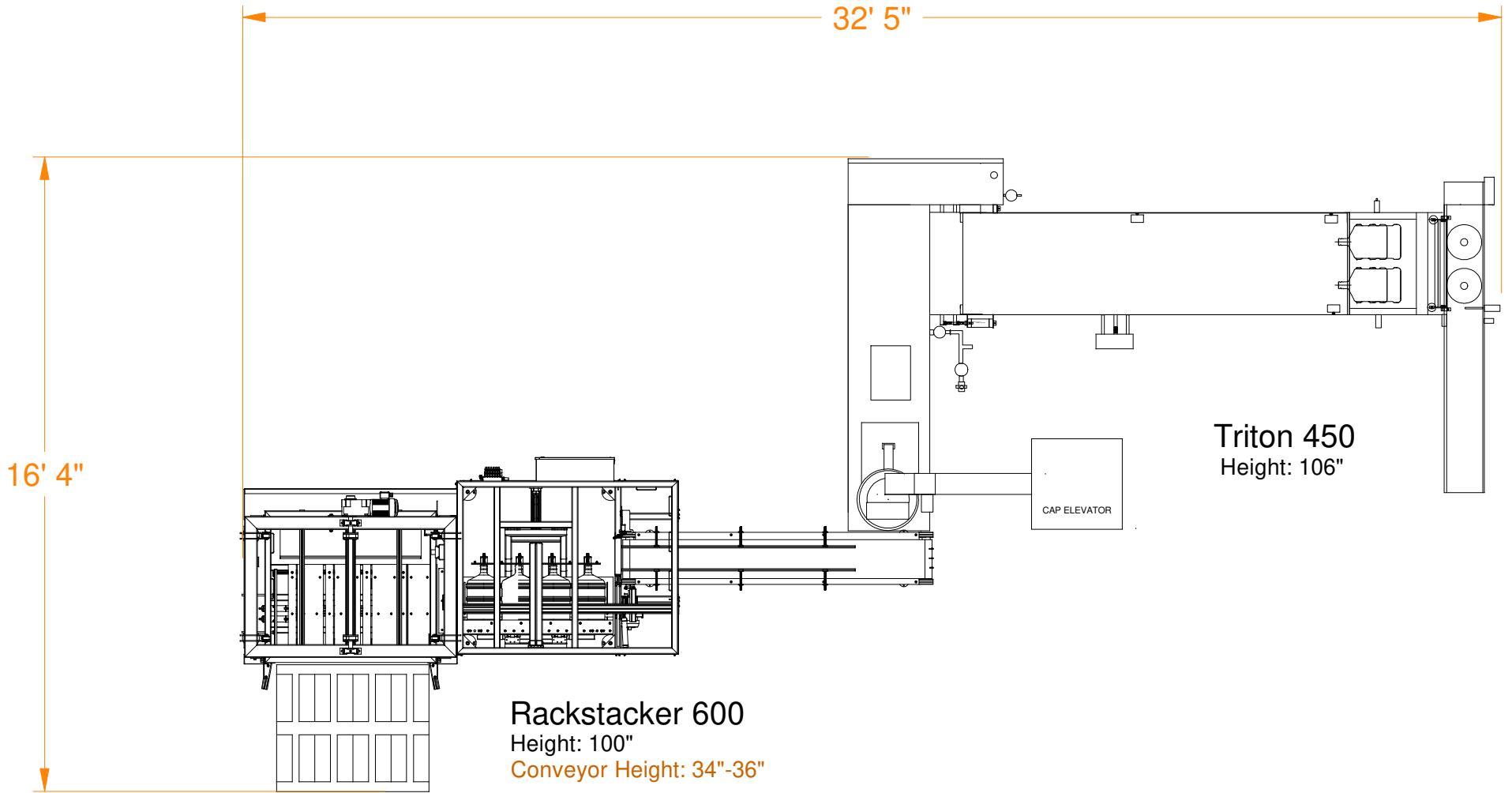


Triton 160
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Conveyor Height: 27"-33"

Rackstacker 600
Height: 100"
Conveyor Height: 34"-36"

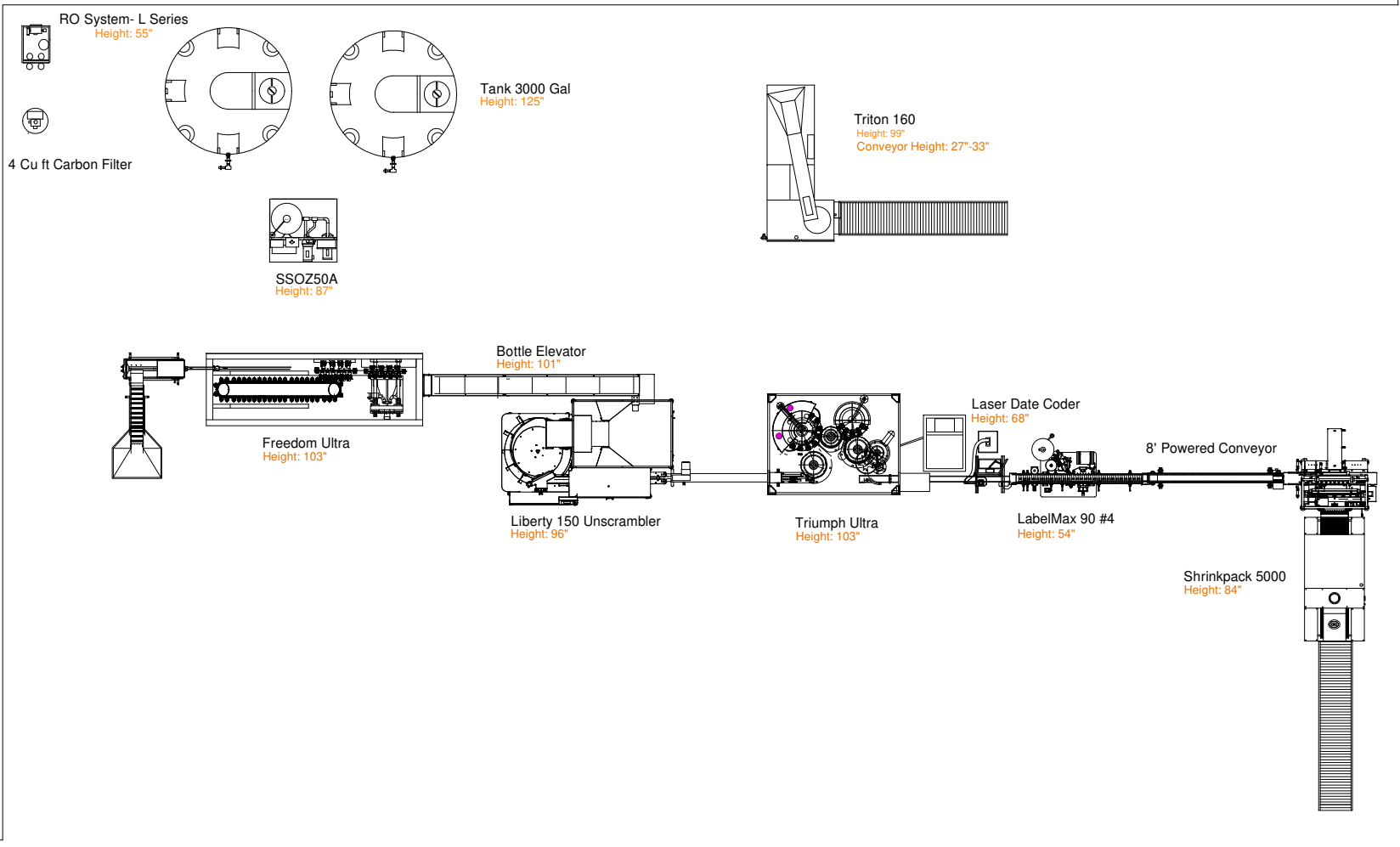






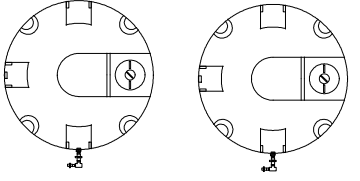
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RO System- L Series
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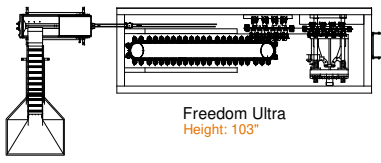
4 Cu ft Carbon Filter



Tank 3000 Gal
Height: 125"

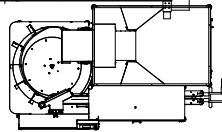


SSOZ50A
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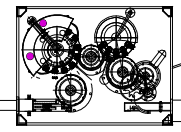


Freedom Ultra
Height: 103"

Bottle Elevator
Height: 101"



Liberty 150 Unscrambler
Height: 96"

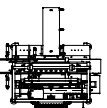


Triumph Ultra
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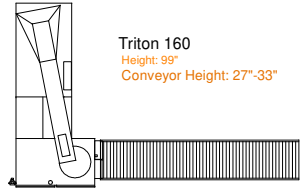
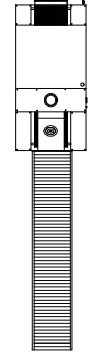
Laser Date Coder
Height: 68"

LabelMax 90 #4
Height: 54"

8' Powered Conveyor



Shrinkpack 5000
Height: 84"



Triton 160
Height: 99"
Conveyor Height: 27"-33"

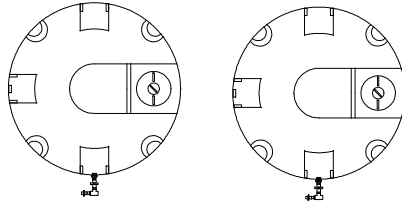
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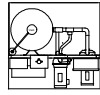
RO System- L Series
Height: 55"



4 Cu ft Carbon Filter



Tank 3000 Gal
Height: 125"

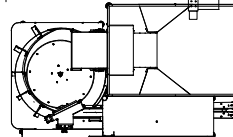


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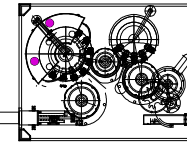


Freedom Ultra
Height: 103"

Bottle Elevator
Height: 101"

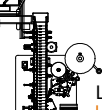


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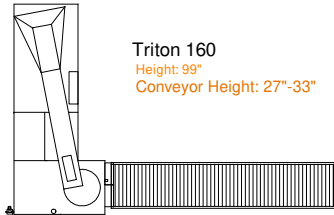


Triumph Ultra
Height: 103"

Laser Date Coder
Height: 68"

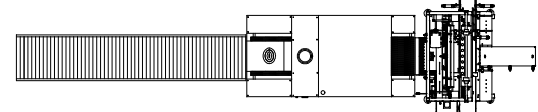


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Height: 54"



Triton 160
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Conveyor Height: 27"-33"

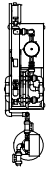
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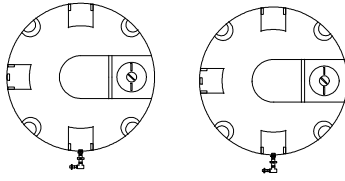
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50' 0"



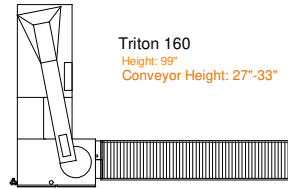
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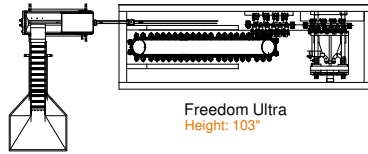
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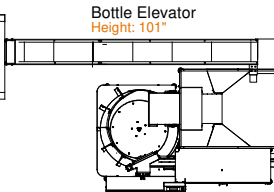
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Height: 87"



Triton 160
Height: 99"
Conveyor Height: 27"-33"

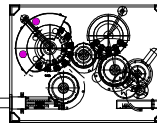


Freedom Ultra
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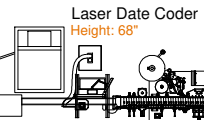


Bottle Elevator
Height: 101"

Liberty 150 Unscrambler
Height: 96"



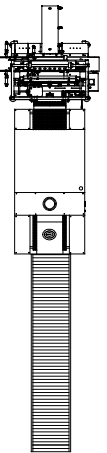
Triumph Ultra
Height: 103"



Laser Date Coder
Height: 68"

LabelMax 90 #4
Height: 54"

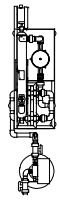
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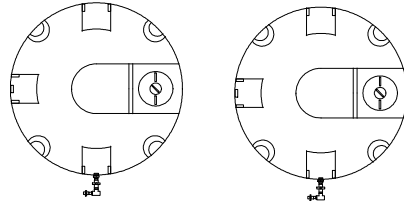
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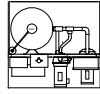
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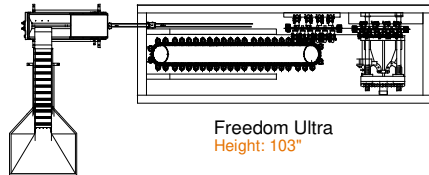
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Tank 3000 Gal
Height: 125"

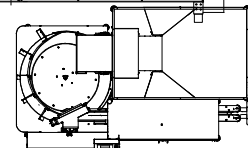


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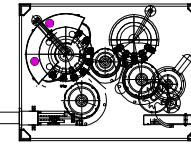


Freedom Ultra
Height: 103"

Bottle Elevator
Height: 101"

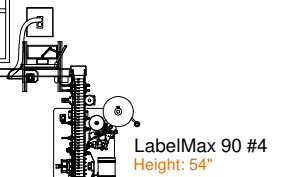


Liberty 150 Unscrambler
Height: 96"

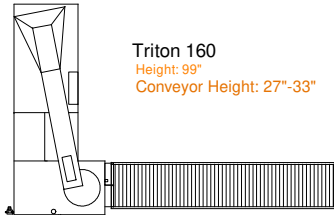


Triumph Ultra
Height: 103"

Laser Date Coder
Height: 68"

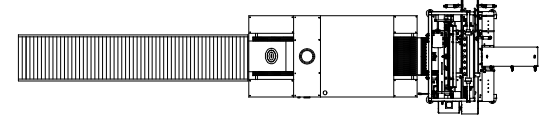


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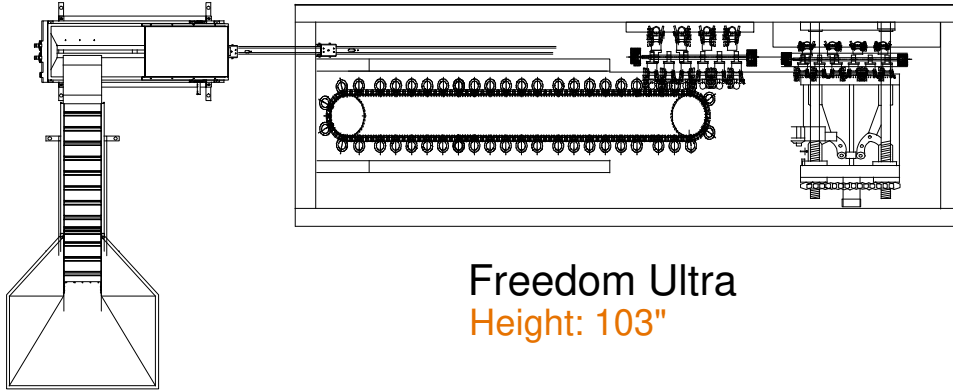


Triton 160
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Conveyor Height: 27"-33"

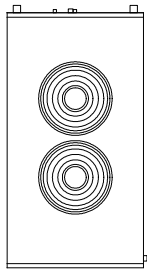
8' Powered Conveyor



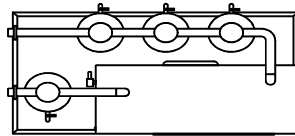
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Height: 84"



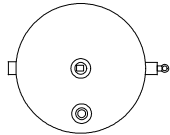
Freedom Ultra
Height: 103"



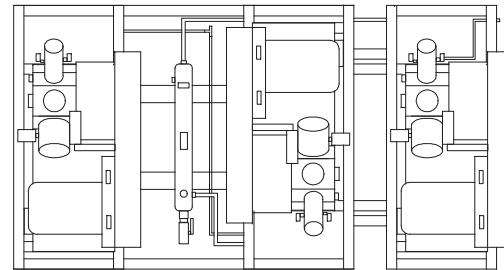
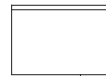
Chiller
Height: 59.5"



Air Dryer
Height: 53"



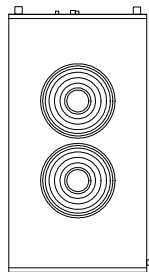
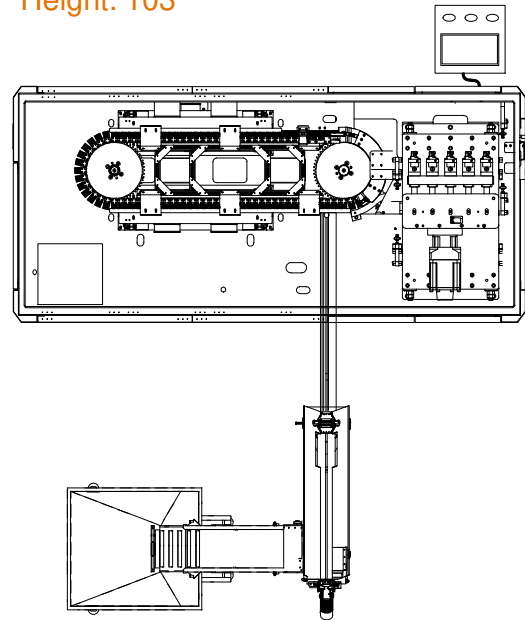
Receiver
Height: 110"



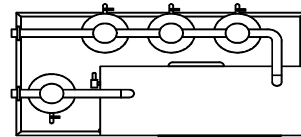
Air Compressor
Height: 78"

Freedom Classic Blow Molder

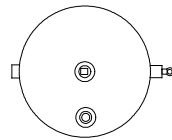
Height: 103"



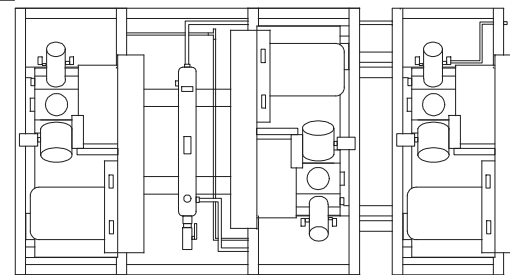
Chiller
Height: 59.5"



Air Dryer
Height: 53"



Receiver
Height: 110"



Air Compressor
Height: 78"

Projected Financial Sheets

Important Notice

The attached Financial Sheets are projections only and are not to be construed as guaranteed in any manner. Your business including costs, expansion rate and overall profitability may vary significantly from the numbers shown. As with any business, there are known and unknown risks that have not been identified nor taken into account on the projected sheets.

The Financial sheets take the following items into account:

Number of Customers per Month - this number is completely subjective and can vary widely. You may not be able to add as many indicated or you may be able to add more customers per month. Based upon our experience, the number of customers added per month indicated on the sheets should be achievable in many larger markets.

Water Price - the sheets indicate the water is being sold for US\$1.00 per gallon (3.78 litres) which is currently the national average for the U.S. Your market may or may not support this selling price.

Amount of Water Purchased per Month - this too is a subjective amount which can vary substantially. From our experience, mid to large commercial accounts, by their sheer size, consume more water than most residential accounts. The Projected Financial sheets indicate the average customer will purchase 20 gallons (75.6 litres) per month.

Bottles - the projections are based upon using 5-gallon (18.9 litre) bottles at a cost of US\$5.00 per bottle. Five bottles per customer have been used for the calculations. On a two-week delivery cycle, this would provide for three (3) bottles at the customer's location and two (2) in transit.

Caps - The projections are based upon using no-spill caps at a cost of US\$0.10 each and using four (4) caps per month per customer.

Coolers - Cook and Cold Coolers have been used for the projections at a cost of US\$130.00 each depreciated over a five (5) year period.

Labels - A label cost of US\$0.25 per label has been calculated. The labels are normally applied to a bottle once and are normally good for the life of the bottle.

Loan Repayment - the projections are based on borrowing US\$250,000.00 and repaying it over 84 months at an interest rate of 9%.

Please keep in mind that there are a wide number of variables in operating a bottled water business. Your costs in all likelihood will not match the costs indicated on the financial sheets.

<u>Production Costs for 5 Gallon Bottles</u>	<u>Cost per bottle</u>		
1). 5 Gallon Bottle Reuse Cost (per use)	\$0.08		
<i>75 uses at \$6.00 per bottle</i>			
2). Label Reuse Cost (used once)	\$0.01		
<i>50 uses at \$0.50 each</i>			
3). Detergent & Sanitizer Cost	\$0.01		
4). Labor 150 bottles per hour @\$8.00 hr.	\$0.06		
5). Water Cost / Drainage Cost	\$0.02		
6). Electricity	\$0.02		
7). Cap Cost	\$0.09		
8). Equipment Ammortization (7 years)	\$0.06		
<i>(1,500,000 bottles @\$90,000 equipment cost)</i>			
9). Maintenance	\$0.03		
TOTAL BOTTLE COST	\$0.38		
5 Gallon Bottle Cost estimate (with handle)	\$6.00		
5 gallon Push On Type / Spill Proof Type caps (each)	\$0.09		
5 gallon Push On Type / Non-Spill Proof Type caps (each)	\$0.05		
Bottled Water Coolers (each) without Spill Proof Insert	\$128.00		
Bottled Water Coolers (each) with Spill Proof Insert	\$132.00		
Cost for Ceramic Coolers	\$23.00		

PRODUCTION ANALYSIS FOR SMALL P.E.T. BOTTLES		Other Considerations	500 ml	1.0 liter	1.5 liter
		Bottles per case	24	12	12
		Cases per pallet	70	55	40
1). Estimated 500 ml bottle cost - including preform, labor and shipping.	\$ 0.070	Bottles per pallet	1680	660	480
2). Cap Cost - (flat caps = \$0.015 / sports cap = \$0.03 each)	\$ 0.010	Pallets per truckload	21	21	21
3). Label Cost - Pressure Sensitive quantities of 2,000,000 ordered (estimated cost for three color paper label)	\$ 0.018	Cases per truckload	1470	1155	840
4). Electricity, water, maintenance, replacement parts	\$ 0.008	Bottles per truckload	35,280	13,860	10,080
5). Shrink-wrap material (estimated Shrink wrapped cost \$0.24 with tray)	\$ 0.010				
6). Labor for bottling and packaging (4 employees per shift to produce up to 4000 bottles per hour Based on \$10.00 per hour labor cost x = \$40 per hour).	\$ 0.010	Total liters in each case (approx.)	12	12	18
		Liters per pallet	840	660	720
ESTIMATED TOTAL TO PRODUCE 500 ML. BOTTLE IN SHRINK MATERIAL	\$ 0.126	5000 Production requirements based on 500 ml bottles			
			Per Day	Per Week	Per Month
				6-days	24-days
					288-days
1). Estimated 1.0 liter bottle cost - including preform, labor and shipping.	\$ 0.110	* 5000 System per hour x 6.5 hour production per day (based on 8 hour working day) 1 Shift only. 500 ml bottle.	26,000	156,000	624,000
2). Cap Cost - (flat caps = \$0.015 / sports cap = \$0.03 each)	\$ 0.010				7,488,000
3). Label Cost - Pressure Sensitive quantities of 2,000,000 ordered (estimated cost for three color label)	\$ 0.027	Product water required. (5000 Line) Volume in Liters	13,000	78,000	312,000
4). Electricity, water, maintenance, replacement parts	\$ 0.008				3,744,000
5). Shrink-wrap material (estimated Shrink wrapped cost \$0.28 with tray)	\$ 0.010	* \$0.05 Average minimum profit per bottle (5000 Line. 60% of volume through Wholesale Distribution.)	\$ 936	\$ 5,616	\$ 22,464
6). Labor for bottling and packaging (4 employees per shift to produce up to 3200 bottles per hour. Based on \$10.00 per hour labor cost x = \$40 per hour)	\$ 0.013	*\$0.14 Average minimum profit per bottle. (5000 Line. 40% of volume through Retail Distribution)	\$ 1,456	\$ 8,736	\$ 34,944
			\$	\$	\$
ESTIMATED TOTAL TO PRODUCE 1.0 liter. BOTTLE IN SHRINK MATERIAL	\$ 0.178	Total possible profit			
		* 5000 Line per hour x 6.5 hours per day	\$ 2,392	\$ 14,352	\$ 57,408
1). Estimated 1.5 liter bottle cost - including preform, labor and shipping.	\$ 0.160	(these are sample figures and may reflect your exact profit potential)			\$ 688,896
2). Cap Cost - (flat caps = \$0.015 / sports cap = \$0.03 each)	\$ 0.009	Building Consideration			
3). Label Cost - Pressure Sensitive quantities of 2,000,000 ordered (estimated cost for three color label)	\$ 0.032	Minimum Square feet required for a standard SpectraPak3000 Plant	5000		
4). Electricity, water, maintenance, replacement parts	\$ 0.008	# of Employees to Operate Equipment			
5). Shrink-wrap material (estimated box cost - \$0.40 / Shrink wrapped cost \$0.28 with tray)	\$ 0.010	* 3000 System per hour x 8 hours per day shift	4		
6). Labor for bottling and packaging (4 employees per shift to produce up to 2800 bottles per hour. Based on \$10.00 per hour labor cost x = \$40 per hour)	\$ 0.014	* 5000 System per hour x 8 hours per day shift	5		
ESTIMATED TOTAL TO PRODUCE 1.5 liter. BOTTLE IN SHRINK MATERIAL	\$ 0.233				

1 Shift	Triumph Ultra Line	Hour	Day	Week	Year
		NC	6.5 hrs per day	5 days per week	52 weeks per year.
	500 ml bottle	5,000	32,500	162,500	8,450,000
	1000 ml bottle	4,000	26,000	130,000	6,760,000
	1500 ml bottle	3,500	22,750	113,750	5,915,000
1 Shift	Triumph Classic Line	Hour	Day	Week	Year
	500 ml bottle	3,000	19,500	97,500	5,070,000
	1000 ml bottle	2,400	15,600	78,000	4,056,000
	1500 ml bottle	1,800	11,700	58,500	3,042,000
1 Shift	Freedom Classic Blow Molder	Hour	Day	Week	Year
	500 ml bottle	3,000	19,500	97,500	5,070,000
	1000 ml bottle	2,400	15,600	78,000	4,056,000
	1500 ml bottle	1,800	11,700	58,500	3,042,000
2 Shifts	Freedom Classic Blow Molder	Hour	Day	Week	Year
	500 ml bottle	3,000	39,000	195,000	10,140,000
	1000 ml bottle	2,400	31,200	156,000	8,112,000
	1500 ml bottle	1,800	23,400	117,000	6,084,000
	Projections based upon:				
	6.5 hours actual per day				
	Standard bottle design				
	Use of De-Scrambler				
	Standard label dims.				
	Flat or sports caps application				
	Automatic Case Packing				
	Automatic Case Taping				



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Guidelines for Label Artwork Submission

General Graphic Design Requirements:

Standard label size is **7.25" wide x 2.0" tall**.

Please ensure that artwork resolution is a minimum of **300 dpi**.

Please include all fonts and images used in label design as separate files.

Native Artwork Documents:

We prefer artwork in its native design document. This helps us to make minor adjustments to optimize printed label output.

We can accept files in the following software versions:

PC: Adobe Illustrator 23.0 or below, CorelDraw 8.0 or below, Corel Photo Paint 8.0 or below.

If your document is created in a newer version of any of these design programs, please re-save or export to a format that we support.

Accepted File Formats:

We also accept files in the following formats: **.PNG; .AI; .EPS; .TIF**.

Submit Files by E-mail:

E-mail to: **office@norlandpure.com**. Please include a sample of your artwork in the form of a **.PDF**.

If you have any questions about submitting your artwork, please call at **402-474-7873** or e-mail **office@norlandpure.com**.



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The Straight Edge
 BARBER SHOP

Transportation and Storage

Source or processed water is stored in tanks just to keep additional water on hand or to buffer operations. Since not all bottled water plants bottle at the source, tanker trucks or transport lines are used to move the water to the plant. It is important to note that any transportation or storage vessel that is used to contain ozonated water must be ozone-resistant and/or have ozone-resistant seals.

Truck Tankers

Stainless steel is the preferred material for truck tank construction, because a **lined** tank on a mobile chassis is subjected to too much twisting and surging to allow a lining to adhere well to the basic tank structure. However, glass- and synthetic-resin-lined tanks are now in use, and have proven satisfactory. Linings that meet the specifications of NSF Standard 60 are also suitable for tankers. Large plastic tanks apparently won't take the vibration and bending forces. Some smaller plastic tanks are in use on trucks.

Truck tanks are baffled to prevent excessive surging from one end to the other. Junctions of baffles and tank shell should be rounded for ease of cleaning. However, it is essential for sanitizing purposes to have each compartment drain to a common point, such as the rear of the tank.

An air filter is an **especially important** part of a tank truck, for the tank is subjected to road dust and other airborne debris. Air pressure changes occur during travel, also. Air filters should be located near the middle of a truck tank.

Air filters that develop high resistance to air when they become wet should not be used on tanks, because a high vacuum could develop in the tank during unloading. Under a vacuum, the tank could partially collapse. For this reason, truck tank air filters and storage tank filters should be of adequate size.

Hoses for loading and unloading should be of FDA-approved material that will not affect odor or taste. PVC plastic hoses have been found satisfactory. The ends of hoses should be covered in transit and must be sanitized before use. This may be done by dipping either end of a hose into a chlorine solution, or by brushing with a chlorine-soaked brush.

As a security measure, unloading hoses at stationary points should not only have covered ends, but the covered ends should be locked inside a metal box or cabinet.

Care of truck tank air filters and sanitation of truck tanks is similar to that of storage tanks, discussed below.

Storage Tanks

Storage tanks should be smooth inside and self-draining. Weld materials should be ground out. Riveted tanks are to be avoided, for rivet hats often present a crevice condition and, are therefore unacceptable for proper lining installation.

There should be ample room around a tank for: a) installation; b) inspection; and c) maintenance. Tanks must be strongly supported to prevent strain and warping. Thermal

strains in piping can break the linings in tank flanges if pipe loops or expansion joints are not used. While built-in spray systems are desirable, filtering vent devices are necessary.

Except for stainless steel tanks, all metal tanks should be lined. Linings may be of synthetic resins. The lining material should impart no impurities, taste or odor to the stored water and must conform to FDA standards for potable water storage.

Maintaining Tanks

Tanks for water transport or storage must be maintained in good repair and regularly sanitized to prevent microbiological contamination of the water. These tasks frequently mean that someone must enter the tank to work on the interior surfaces. Refer to the section in this handbook on OSHA requirements for confined space entry.

ENTERING TANKS IS HAZARDOUS!

Tanks are dangerous because:

- Atmosphere may contain toxic gases or insufficient oxygen.
- Interiors of tanks can become extremely slippery.
- Tank interiors can become very warm and humid; heat exhaustion is possible.
- Use of electrical lights in tanks presents shock hazard.
- Built-in spray systems and brackets present head injury hazard.

TAKE THE FOLLOWING PRECAUTIONS BEFORE ENTERING A TANK:

1. Notify a foreman or other responsible employee that tank is out of service and work is being performed inside it.
2. Lock off all valves to the tank.
3. Double-check to be sure that tank is drained completely before removing manhole cover.
4. Never remove “strong backs” completely until sealing edges of manhole cover are broken and it is verified that tank is free of water, air pressure, and vacuum.
5. When using an electrical cord and/or portable electric light: Is bulb shielded? Is cord waterproof with no insulation breaks? Is ground wire connected to ground?
6. Set up a small forced-draft blower outside tank to blow air into tank via a flexible duct. The suction of blower should be placed so that exhausted air from tank will not be recirculated into the tank.

Upon completion of work, notify foreman that tank can be placed back in service.

Although several different **scrubbing and/or sanitizing** agents may be used for scrubbing tanks, chlorine (hypochlorite) is often preferred in the bottled water industry. Ozonated water can also be used as the sanitizing agent in tanks.

The frequency with which tank scrubbing is necessary depends upon the amount of organic matter present in the stored water and the degree to which microbial growth is prevented. Routine testing of water for total coliform and heterotrophic plate count (HPC) and monthly visual examination of tanker interiors are essential for evaluation of tanker sanitization.

Microbial growth can be inhibited by frequent ozonation of water in the tank or maintenance of a small chlorine residual (0.2 to 0.5 ppm) in the stored water at all times.

Do not forget to scrub **sight glass or plastic** tubes periodically, as these can be a source of microorganisms that can inoculate a freshly sanitized tank. The 16 steps for cleaning tanks are:

1. Isolate tank from other tanks and lines by closing valves. Inspect valves.
2. Carry out safety precautions as previously outlined.
3. Remove, clean, and re-install air filter and vent piping.
4. Add roughly 50 gallons of 100-200 ppm chlorine solution into the tank (see section C below for Preparation of Chlorine Solution). If done by spray, allow 15-20 minutes contact time.
5. Place nylon-bristled brush into tank. If wrench is used for removing spray head, be **very** careful not to **drop** the wrench. Tank linings are thin, delicate coverings and are easily broken by a dropped wrench.
6. Don rubber boots after washing them in 200-400 ppm chlorine solution. Be sure no sand is on soles of the boots.
7. Enter tank.
8. Inspect linings and fittings.
9. Remove and clean spray heads, if present. Reinstall.
10. Sanitize sight glass or plastic tube by pumping chlorine solution upward through it. Use "Presto" pump on 5-gallon bottle if necessary. If tube needs scrubbing, remove it for cleaning, sanitizing and rinsing with ozonated product water.
11. In all tanks, always start at the highest pint so that "dirt" doesn't fall onto areas already scrubbed. For horizontal tanks, start scrubbing at the top of the inside

end panel, dipping the brush into the chlorine solution frequently. For vertical tanks, start scrubbing at top panel.

12. Scrub manhole cover and gasket (replace and seal, if spray system is used).
13. Drain scrubbing solution from tank.
14. Rinse with 100 ppm chlorinated water followed by rinse with ozonated product water (0.1 ppm or more). Use lightly chlorinated product water (0.2-0.5 ppm) instead of ozonated water if this water is to be stored in the tank. Rinse until test shows completeness.
15. Close all drains.
16. Put tank into use, or alternatively for distilled water tanks: add about 1/6 tank of water.

For **purified water**, frequency of tank cleaning may be reduced by **ozonating at night once each 1-2 days** (except on weekends), as long as tank is made of stainless steel or other material resistant to ozone oxidation. In this way, bacterial growth may be controlled in water storage tanks over long periods.

Scrubbing is infrequent but should not be delayed excessively. Periodic inspection of linings is necessary to spot possible breaks and tank rusting.

For water treated by reverse osmosis (essentially organic-free), storage with a light chlorine residual (0.2-0.5 ppm) may reduce the frequency of tank cleaning.

A reduced frequency of tank scrubbing cannot be employed for tanks storing non-ozonated distilled water, water with sufficient organic matter to deposit on tank walls, or water containing iron.

Solvents from synthetic resins are toxic, and when used in the confined tank space, the following precautions should be taken:

1. Use an approved respirator (activated carbon) of sufficient capacity.
2. Use a blower of sufficient capacity, located outside the tank; keep blower intake away from air exhausted from tank.
3. After application of **each** coat of synthetic resin patch, the tank must be **force-dried** with warm air (140-150° F air temperature) for 16 hours.
4. At finish of repairs, it may be necessary to force-dry the tank for 48 hours.
5. After final drying, the tank should be **thoroughly sprayed** with softened process water, scrubbed and sanitized.
6. The tank then should be filled to 1/6 capacity and allowed to sit overnight.

- Water should then be tested for taste and odor in comparison with fresh product water. Tests for bacteria and organic matter (USP oxidizable substances) may be run simultaneously.

Storage tank air filters should be dismantled, cleaned, and sanitized, or the element replaced each time the tank is scrubbed. Each time the filter is removed, clean filter piping by dismantling.

Stainless steel mesh filters may be cleaned and sanitized by washing in “Quat” (quaternary ammonium compound) solution, a surfactant, and blowing dry with filtered air.

Records

The following records of all tank maintenance should be kept:

- Dates of all tank sanitations or scrubbing-sanitations.
- Dates and types of tank repairs.
- Bacteria count results on tank water.

Preparation of Chlorine Sanitizing Solutions

To prepare 5 gallons of 200 ppm chlorine sanitizer solution, follow these directions. Using household chlorine bleach (5.25% active chlorine):

1. Use formula: Amount1 (am't1) x concentration1 (conc'n1) = Amount2 (am't2) x concentration2 (conc'n2)
2. The unknown quantity is "how much bleach to use," that is am't1
3. Solve equation for the unknown: $am't1 = am't2 \times conc'n2 / conc'n1$
4. am't2 = 5 gal. Conc'n1 - 5.25%, but use 5%, because chlorine solution deteriorates. Conc'n2 = 200 ppm But all am'ts and all conc'ns have to be expressed in the same measures.
5. Therefore, change all am'ts to fluid ounces, and all conc'ns to parts per million (ppm).
6. Am't1 = "x" fl. oz. Am't2 = 5 gal x 128 fl. oz. / 1 gal = 640 fl. oz. Conc'n1 = 5% = 5/100 = 50,000/1,000,000 = 50,000 ppm Conc'n2 = 200 ppm
7. Solve equation in “3” above: $am't1 = 640 \text{ oz.} \times 200 \text{ ppm} / 50,000 \text{ ppm} = 2.56 \text{ fl. oz.}$
8. Therefore, add 2.56 fl. oz. of household bleach to 5 gallons purified water to prepare 5 gallons of 200 ppm chlorine solution. The result will not be exactly 200 ppm (but close) because chlorine bleach conc'n is only approximate.

Medium-Sized Bottler Finds All the Business it Can Handle

By Bruce Kucera

Summary: Water Treatment dealers who have yet to enter the bottled water niche may want to follow the lead of an Oklahoma business. Still, this specific example shows that dealers should ask themselves a few questions before entering their own bottled water markets. While the rewards are great, it's not for the faint of heart.

Blue Valley Water Company is a thriving bottled water firm based in the small east central Oklahoma town of Hartshorne. Blue Valley's story provides an excellent start-up model for entrepreneurs interested in entering the rapidly expanding bottled water market. Hartshorne, about 90 miles south of Tulsa, is a town of 2,100 residents.

Blue Valley Water was founded in 2001 by Warren Lindley. A successful businessman with a local grocery store, he saw that bottled water could potentially be a great business. He started looking around for an equipment source. His research led him to the internet, where he found a manufacturer of bottled water equipment designed specifically for companies serving small to medium sized markets.

"I was impressed by its product line, which seemed to include the type of equipment I needed to get started," Lindley said. "They understood the water business and they knew that startup businesses in small towns didn't need the large equipment that other companies were offering."

A turn(key) for the best

The first equipment Blue Valley Water bought was used to process 500 milliliter (ml) bottles for the private label business. The turnkey bottling plant includes a bottle feed table, automatic bottle rinser, a bottle filler/labeler/capper, cap tightener, ink jet date coder, accumulation conveyor and table. The system can process up to 85 bottles per minute and can be operated in several different configurations from straight line to right-angle to fit small, confined areas.

When Blue Valley started up, Lindley focused his business on supplying local food distributors and retail outlets as well as providing private label bottled water to businesses and organizations in the Hartshorne area. Needless to say, business went well.

As Lindley was getting ready to open his bottled water business, a Tulsa based food distributor proposed to him that Blue Valley provide it with bottled water for its convenience store and supermarket clientele in Oklahoma. The opportunity was too good to pass up, Lindley said. "When you go into business, it's important to have a good feel for the size of your potential market," he said. "Our partnership with this distributor went a long way toward ensuring us sales volume for the bottled water market for PET plastic, also known as polyethylene terephthalate.

"Private label yields about 30 percent more profit than retail," Lindley said. "We haven't had much time to fully develop this market yet.

While we do some, our retail business has grown so quickly that our efforts have been directed there.”

Delivering the home

Another year has brought another marketing idea from Lindley. Always keeping an eye out for new opportunities, he was ready to give home delivery a shot by the middle of this year. He added a distiller and a washer/filler/labeler to process 3-gallon and 5-gallon bottles for the new market niche.

The distiller can produce up to 6,000 gallons (22,712 liters) of water a day. The unit operates very efficiently, requiring as little as 0.10 kilowatts per hour (Kw/h) of electrical power to produce a gallon (3.78 L) of distilled water. Plus, while some competing distillation systems can use up to three gallons (11.34 L) of reject water for every gallon of purified water produced, this distiller produces nearly six gallons (22.7 L) of distilled water for every one gallon of reject water.

Easy to operate

The new automatic bottle washers/filler/cappers, which Lindley bought are ideal as a turnkey production line for 3- and 5-gallon bottles. The unit automatically washes, fills and caps up to 450 bottles an hour of most standard sizes and styles with no manual adjustments. It’s available in production rates of 160 and 450 bottles per hour, and features stainless steel piping for longevity, durability and minimized maintenance. The multi-function programmable logic controller (PLC) provides immediate digital readout of system functions at a glance.

“We entered this market just this summer, and had 112 home delivery customers the first week. This market is growing so quickly,” Lindley said. “At the rate we’re signing up

customers, we expect to have about 2,000 delivery customers by the end of the year.”

It’s not unusual for the Blue Valley Water to ship 13 to 15 semi-truckloads of water per week of the 20 ounce and 1-gallon PET bottles, according to Lindley.

“We started small but are always looking for opportunities to expand the business,” he said. “When the arrangement with the dealer came up, we saw a promising opportunity and it certainly has developed into a highly profitable arrangement.”

Conclusion

Lindley offers three key pieces of advice to entrepreneurs who may be looking at starting up a bottled water business:

- *Start slowly* – Buy only equipment you need when you need it. It’s not a good idea to invest in equipment before your market is ready. Talk to your equipment supplier, be prepared and plan for what you may need when the time is right. But don’t commit dollars until it’s a must.
- *Look for opportunities to expand your business* – Know the choices that will be available to you when the timing is right. When you discover the opportunities, be ready to act quickly to take advantage of the situation before someone else does.
- *Find a dependable equipment manufacturer to partner with* - “It’s best to find a single source for your equipment,” Lindley said. “That way, you know the equipment is compatible, you are familiar with the company’s level of after sale support and service and you can build a partnership with them based on trust. I found the right supplier, one that was experienced in

the bottled water industry, that could provide expert advise on my business development and not just my equipment.

“The key to success is to be prepared and ready for an opportunity when it comes knocking,” he said. “It doesn’t always knock a second time.”

Five Valuable Tips for the Home Delivery Business

By Bruce Kucera

As demand for bottled water grows, so do the options of water bottling businesses to identify and develop profitable market niches. Certainly, home delivery of 3- and 5- gallon bottles is central to a solid bottled water business.

There are several key business factors a startup water bottling company should consider when deciding to offer home delivery:

- Is your market area conducive to home delivery?
- Do potential customers want this type of bottled water service?
- What type of delivery vehicles should you use?
- Should you add non-water products such as coffee to your delivery service?
- Should you extend your brand to include delivery of small PET bottles?
- What about providing private label bottled water as a promotional item for churches, schools, businesses and special events?

The more market research you can do, the better, as long as it's prior to committing your resources to a particular market niche. You don't want to find out the hard way that your target audience doesn't want your product or service. You'll also need to know if you'll face competition in your targeted market area.

Key on the primary

There are two basic types of market research available for your use – primary and secondary.



Secondary research is generic information such as census figures, chamber of commerce studies, and the like that any business person can use. But primary research is the most valuable and helpful. It can help you answer specific questions. Primary research is conducted by you, or you may hire a market research firm to handle it. In either case, the questions asked of a sampling of actual potential customers are developed to provide answers specific to your needs.

You'll want to find out if home delivery of water is already in demand (i.e. they'd take it if it were offered), whether they already have access to such a service (i.e., competition exists), or whether answers indicate you could create demand through concentrated promotional and educational efforts. Your job will obviously be easier if there's already a demand for home

delivery in your area – even if there is competition.

If there's a home delivery company already established in your target area, you must decide if there's a clear differentiation between your products and services and theirs.

Does your competition offer other products in addition to water? Can you provide a wider choice of bottle sizes or other options? Can you beat them in price? If you can

position yourself as offering better products or services, you'll need to decide how to communicate to your potential customers why you're the better choice. How will you communicate that message?

The market research step is vital. Before you invest in a business, make sure you're entering a viable market. Take a close look at your targeted market area to determine:

- The appropriate size for your market area. Logistically, within how large an area can you effectively and efficiently distribute your products?
- Is the population within your selected target area large enough to support your business? We recommend a base population of about 50,000.
- Are there indications that people in this area use bottled water?
- What is the level of competition in the area for bottled water?



Once you've determined yours is a potentially successful market, you'll have several seemingly mundane factors to consider.

Truck or delivery van?

The first factor is what type and size of vehicle you should use to deliver products.

The choice is typically between delivery vans and larger cargo bay delivery trucks. For the small-to-medium operators, the choice

will most often be the van. The reasons are simple:

1. Delivery vans are usually much less expensive than larger cargo trucks. A well-equipped van typically is priced in the low-to-mid-\$20,000s. On the other hand, more elaborate big trucks with specially designed cargo bays can run as high as \$50,000 each.
2. A van can typically hold up to 135, 3-gallon bottles or 95, 5-gallon bottles. Often, the van driver can make up to three runs each day, which can allow the delivery of up to 400, 3-gallon bottles or nearly 300 5-gallon bottles per shift. While the larger trucks can hold more, other considerations may make them less efficient overall.
3. The larger trucks are more difficult to handle and also require special driver certification. This will limit your choice of drivers. Remember, your delivery people represent you and your company every time they enter a home

or business with your water. You'll want to hire employees based on their "people" skills, not so much on driving skills. No particular driving experience is necessary with a van.

4. Larger trucks can be an inconvenience in certain areas of town. In business districts, for example, parking may be a problem. Narrow streets combined with curb parking can force drivers to double-park, which in the long run can cause ill will within the area as well as the potential for parking tickets. Even in some older neighborhoods, narrow streets can cause similar problems. The need to drive around looking for suitable parking can lead to lower deliver times, which in turn drives up your cost for each stop and reduces your overall profit.

Coffee Service

Should you add coffee delivery to your services? If you have competition and they offer coffee services, then your answer is definitely "yes." To compete, you'll have to meet the competition's services.

Coffee is a high-profit beverage many smaller operators overlook. Often, an operator may not even consider this a viable option simply because finding a reliable source for quality coffee grinding may seem too difficult. In fact, there are now several regional coffee supply houses that make available coffee blends for either private label packaging (yours, for example) or for their own "house brand" local sale.

Coffee offers several significant advantages to the smaller operator. First, dry coffee has virtually unlimited shelf life. Since it's virtually a non-perishable item, it can stay in your inventory, or the customer's food pantry, for months without losing flavor or quality. Second,

dry coffee weighs very little, so it's easily handled, takes limited space on a delivery van so your all-important bottle counts aren't affected, and takes little or no sales expense and effort to sell. Typically, the delivery person either introduces the idea of coffee service to the customer as he makes a delivery, or attaches a flyer to the freshly delivered bottle. For residential customers, coffee may be sold by the packet or case. For business customers, it may be necessary to provide brewing equipment as well, which may provide you with even more rental revenue.

PET small bottles

Brand recognition is one of the most important factors in developing a successful business. If you're already delivering your product to satisfied residential and business customers who've come to appreciate your brand, it may make good business sense to extend your product line by offering the convenience of small bottles as well.

Almost certainly, your customers are already buying bottled water from somewhere (a soft drink vendor, perhaps, or a nearby supermarket or convenience store). Still, you should be the water expert in your customer's eyes - their source for clean, fresh water. Why shouldn't they buy their small personalized bottles from you too? Whether you bottle your own PET bottles, or you contract with another company to private label them, this will open a new revenue stream for your business.

If your bottling plant is equipped only with a large format 3-5 gallon production line, the addition of a small format PET line can be much less expensive than you might think. Since your production needs may not require a high-speed, high volume system, you may want to look for an equipment manufacturer that can provide a start-up system to keep your initial investment as low as possible. This will allow you to

maximize your current customer base by supplying them with your own company-branded, PET bottled water.

Private label lines

If you add small bottling capabilities to your plant, you may also want to provide “private-labeled” bottled water for your customers special events or promotions. Private labeled water is being used by schools, churches, businesses of all sorts and special events to generate their own name recognition, raise funds and often, just for fun. Private labeling is great for personal use as well as weddings, family reunions, etc. This isn’t a market in which the big bottles are likely to enter, simply because volume isn’t going to be large enough. That leaves the market to you!



Conclusion

As you consider entering the home delivered, bottled water business, you need to know your market and make wise choices in how you setup your business, right down to the delivery vehicles you choose and the product extensions you can offer customers. Demand for bottled water is growing, whether for home and office delivery or for point-of-use sales. Now’s the time to jump in. The water is fine.

Pretreatment of feedwater for bottled water applications

By John Swancara

Summary: The proper identification of contaminants is critical to operating a successful bottling operation.

The identification of specific contaminants and their treatment before water reaches the bottling stage is critical to the operations of a successful water bottling plant. Failure to treat these contaminants effectively may lead to contaminated product water, costly product recalls and potentially loss of customer trust.

That is why any operator should get an official water analysis from a reputable lab. Such a water analysis should show everything, minerals, organics, etc.. that is in your source water down to parts-per-billion (PPB). Armed with this water report, your water equipment provider can recommend the correct pre-treatment solution for your specific needs.

Water Sources

There are several types of water that a bottler may use. We will discuss each of the types below:

Spring Water

Definition: Water derived from an underground formation from which water flows naturally to the earth's surface.

Contaminants: Turbidity, nitrates, total dissolved solids (TDS), bacteria, and iron or manganese.

Pretreatment solution: Options include multimedia filtration down to 10 microns, depth

filtration down to 5 microns, ultraviolet units, and depth filtration down to 1 micron.

If ozonation is necessary, other pretreatment options may be needed to remove iron or manganese from the feed water. In some cases of heavy bacterial contamination that occurs on a steady basis, chlorination of water and then chlorine removal by carbon filtration is necessary.

Well Water (or bore hole water)

Definition: Water derived from a hole bored or drilled, which taps the water of an aquifer.

Contaminants: Nitrates, TDS, iron/manganese, bacteria, bromides and pH balance problems.

Pretreatment solution: Multimedia filtration, aeration, depth filtration down to 1 micron and ultraviolet application.

As with spring water, if ozonation is to follow, other pretreatment may be required to remove iron or manganese from the feedwater. In some cases of reoccurring heavy bacterial contamination, chlorination of the well and carbon filtration may be required.

If bromide levels are high, generally over 0.02 ppm, ozonation of the water may not be possible. Therefore, ultraviolet units followed by 1-micron absolute filtration will be required.

Correction of pH levels may be needed for very low pH values from wells. Many low pH

conditions result from carbon dioxide gas in the water. Aeration will drive this out of the water.

In some cases, sacrificial calcium carbonate filters will raise pH values as well.

Reverse Osmosis

Definition: purified water produced by the RO process and meeting the definition of purified water in the United States Pharmacopoeia.

Contaminants: bacteria, silica, hardness, turbidity, iron and manganese, chlorine in municipal supplies, and aluminum.

Pretreatment methods: Bacterial contamination of feedwater should be reduced, if possible, by ultraviolet units before feedwater enters the RO system to help prevent biofouling of RO membranes.

Sodium bisulfite can be injected in the feedwater as well.

Turbidity can be reduced by multi-media filtration, followed by 5-micron filtration.

Hardness is typically reduced by softening incoming feedwater. A twin alternating automatic regenerating system is preferred to prevent any hardness bypass to the RO unit. Anti-scalant chemicals can also be used to keep hardness minerals and not scale membranes in suspension.

Silica can be a problem if it is over 20 ppm in feedwater. If levels are high, the recovery rate of RO systems can be changed or the incoming feedwater pH lowered by acid injection.

The current preferred method is to inject an anti-scalant solution into the feedwater to keep the silica in solution until it goes out of the

system in the reject drain water stream. In this case, a good product flush system should be installed on an RO system as well.

Iron and manganese need to be removed from feedwater by pretreatment methods such as aeration, chlorination, softening or can be kept in solution with the use of anti-scalants.

Prior to the RO system, chlorine must be removed with poly amide type membranes and carbon filtration or sodium bisulfite injection. Chlorine will attack the membranes causing loss of product quality.

Distillation-processed water

Definition: Water that has been vaporized, condensed and meets the definition of purified water in the US Pharmacopoeia.

Contaminants: Include chlorine, high total dissolved solids, hardness, silica and high chloride levels.

Pretreatment methods: Chlorine should be removed with carbon filtration before it enters the distillation equipment. Otherwise, the chlorine will attack internal parts made of stainless steel. Very high TDS will dictate the need for an RO unit before distillation or the use of a special seawater type distillation system.

A twin alternating automatic regenerating softener is recommended to remove hardness before feedwater enters the distiller, since the hardness may cause scaling problems.

Silica levels need to be tested for large-size distillers. High silica levels may result in silicate formations inside the distiller.

John Swancara is an engineer at Norland Int'l

Water Source	Potential Problems	Treatments
Spring Water	Turbidity Nitrites Total Dissolved Solids (TDS) Bacteria Iron or manganese	<ul style="list-style-type: none"> • Multimedia filtration • Ultraviolet systems • Filtration down to 1 micron absolute
Well Water (bore hole)	Nitrates TDS Iron or manganese Bacteria Bromide pH problems	<ul style="list-style-type: none"> • Multimedia Filtration • Aeration • Filtration down to 1 micron • Ultraviolet systems
Reverse Osmosis Water	Bacteria Silica Hardness Turbidity Iron and Manganese Chlorine Aluminum	<ul style="list-style-type: none"> • Ultraviolet system • Inject sodium Bisulfate or carbon filtration • Multimedia filtration • 5-micron filtration • Acid injection • Anti-solvent injections • Softening
Distilled water	Chlorine High TDS Hardness Silica High Chloride level	<ul style="list-style-type: none"> • Carbon filtration • Reverse Osmosis prior to distillation • Softening

Private Labeled Bottled Water:

A Profitable Niche in a Fast-Growing Industry

By Bruce Kucera

The key to building a profitable business is to find the right market niche. Marketing 101 tells us to find the corner of an industry that may be unrecognized or underserved and where there's a demonstrable need. Find a unique product, or adapt an existing product to an innovative application, and you have the makings of a profitable business.

A thriving market

Home-delivered bottled water services thrive in many [arts of the country, and the market for small bottles is exploding. You see people with bottles of water walking down the street, at the stores and on their way to school or work. Of course, people have always consumed water. It's how they're doing it that opens up doors to a profitable business.

Bottled water remains the fastest growing major beverage category in the United States. Just look around your neighborhood supermarket, vending machine or convenience store. You'll see bottled water side by side with all the popular soft drinks. Bottled water has moved past coffee and milk into second place behind soft drinks and is continuing to climb while soft drink sales stall.

With the bottled water industry booming, competition is growing. Many of the nation's largest soft drink bottlers are marketing bottled water. It's not always easy to sell against the big guys, and fighting for shelf space in supermarkets and convenience store chains is even harder.

Your own brand name

There is one bottled water market segment in which small, local bottlers often have an advantage over the national brands. This promising market niche is private labeled bottle water. It's creating an entirely new, highly profitable market for the product, with margins running from 50 percent to as high as 200 percent. Private labeled bottled water can be a perfect promotional item, used by: schools, churches, restaurants, businesses and special events of all kinds, to generate name recognition, raise funds and often just for fun.

The private label market isn't one likely to be tapped by the big bottlers. They're interested in high volume, even though that may mean low per-unit profit. That leaves private labeling to local marketers, handling local demand with product produced and distributed locally. This means a big opportunity for you.

One visionary who saw, and grasped, this opportunity is Ken Vaughn, of Spring Water Promotions, located near Atlanta, GA. In just two years, he doubled his business and expects growth to continue well into the future.

Great for small operators

"Private labeled bottled water is a great business for the small operator," Vaughn said. "I can go to any number of local businesses and provide them with a service and a product that the large soft drink companies are usually not interested in."

Vaughn and his family looked for ways to capitalize on a high-quality spring on the

family's property. They tried setting up a bulk water delivery business, but without major success.

"We found that we were simply unable to compete with the other suppliers who were willing to cut their prices just to keep the water flowing," Vaughn said.

At the time, Vaughn was finishing his work on a Master's degree in business management from the Keller Graduate School of Management. He was required to write a business plan as part of his degree requirements. He and three of his group partners chose to write their plan on the private labeled bottled water business.

Vaughn found that there was already market acceptance for the idea on the West Coast and in some small pockets of other U.S. regions. "The demand was there," he said. "But very few bottlers had recognized the marketability of the product."

The rest is history. Using his master's thesis as a starting point, Vaughn launched Spring Water Promotions in 2000. His company focuses exclusively on private label bottling while providing water for a wide range of promotions and special events in the region.

Room for growth

Who should consider getting into the private labeling business? Three examples come quickly to mind:

- Entrepreneurs already in the bottled water business. This new market provides an obvious opportunity at product line extension for those who already know the bottled water industry.
- Those in other water-related businesses, such as water treatment services.

- Anyone looking for a promising new business venture.

In the first two categories, the reason is clear: You know the water business and already have your feet in the door of many prospects for this new product line. It's a logical product line extension and your name and reputation have already been established. But for those who may not have bottled water experience, the door to a successful new business is wide open. There's a growing demand, a promise of reasonably fast return on investment, and moderate start-up costs.

For those who have no experience with the bottled water industry, the good news is that getting started isn't terribly complicated or, for that matter, terribly expensive. It's more important to have a strong entrepreneurial drive and a creative mind that will help you find new ways for potential customers to use private labeled bottled water as a promotional tool.

Evaluate intended market area

It's critical before you set up shop to carefully analyze your market. Several key factors will impact decisions:

1. Measure your potential customer base. The ideal situation is to be located in an area with a population of at least 50,000. The types of organizations and events that lend themselves to using private labeled bottled water are typically found in larger communities. There have been private label bottlers, however, who've succeeded in smaller population areas where the right mix of other factors was present. You'll need a consistent demand for bottled water and larger organizations can provide that need.

A fairly large population base is necessary, because to break even you'll need to

sell about 12,000 bottles a month, assuming you're selling only private label water. Most bottlers start showing a profit in as few as 12-18 months. In terms of profit margin, there's no argument that this sector of the industry generates the highest margin of all marketable water. Profit margins of at least 50 and as high as 200 percent are common.

2. Evaluate the competitive situation in your area. The larger the community, the more likely there are one or more bottled water companies serving the area. Are any of them already offering private labeled services? If so, to whom is the product being marketed? Is your competition doing a good job of servicing the area? Does your competition bottle locally, or have its product shipped? If so, they may be at a distinct disadvantage because of shipping costs.
3. Highlight the big crowd pleasers. Are there any large events in your area that annually draw large crowds, such as state or county fairs, concerts and athletic events, etc.? (High schools and colleges are excellent potential clients.) These are important venues for you and potential customers.
4. Look for natural affinities. What's the demand for bottled water in general in your community? Are you in a hot climate? Does home-delivered, five-gallon bottles of water thrive? This will give you an indication of the level of demand for bottled water in your city.

Find suitable facilities

This is relatively simple. There are no significant requirements about location, or any building code concerns that may have health

implications, as there would be if you were producing food products.

In fact, you don't even need much space. As little as 1,500 square feet will handle all the equipment you'll need for a small-to-medium sized bottling plant. Typically, a two-person team can handle production if your plant is equipped with an efficient, well-designed and integrated system.

Equipment you'll need

You'll need a complete plant system capable of handling the full scope of production required to follow International Bottled Water Association (IBWA) and U.S. FDA regulation; including water treatment, storage, disinfecting, filling, water testing and label printing. You'll pay for this complete plant system about what you'd pay for a new, well-equipped Chevy Suburban.

It's best to buy a complete production plant from a single source. Some manufacturers make only one, two or three pieces of equipment, then fill out their plant with units bought from other manufacturers. Equipment compatibility is essential and using units manufactured by more than one company often causes functional problems.

You'll want equipment that's easy to maintain. Some available equipment is more quickly serviced than others. Downtime costs you money. Try to find equipment that uses few custom parts. You don't want to wait for parts. It's best you choose a system that makes use of as many generic parts as possible. Such parts are easy to obtain at your local hardware store. Be sure to ask your equipment supplier about parts availability.

Finally, you'll want a system that has been designed and built by a company that specializes in bottled water equipment, not

one that focuses on other markets and manufactures bottling equipment as a sideline.

Conclusion

The private labeled bottled water market is a viable business model, either on its own or as a supplement to your main bottled water business. It presents an opportunity for entrepreneurs with the vision and drive to seize the challenge. For businesses already in the bottle water industry, private labeling is an easy product line extension. For those who have no previous knowledge of bottled water, it's a relatively easy business venture to enter.

As Vaughn found out, private labeled bottled water can be very profitable. "It's worth the effort," he said.

The Use of Distillation Technology in the Bottled Water Industry

By Bruce Kucera

Summary: Distillation is one of the most natural and efficient technologies available for purifying water supplies for use in the bottled water industry. Previously, cost was an overriding issue working against it. But new designs have led to more cost-efficient options for dealers.

Distillation technology replicates the hydrological cycle found in nature, using the simple evaporation-condensation-precipitation model. Historically more expensive than the reverse osmosis (RO) process because of higher initial investment in equipment and the electrical power required to boil water, the latest distillation technology has closed the operational cost gap with RO.

In practice, many bottled water operators use a combination of methods to remove impurities from their source water prior to introducing it into the bottle-filling process. That's because no one method can remove all impurities. Available methods include: distillation, RO, activated carbon filtration, ultraviolet, and ozone disinfection and ion exchange.

The most common single method of removing contaminants from source/ feed water with the bottled water industry is RO, with about 40 percent of U.S. bottlers. Approximately 15 percent use distillation and the other 45 percent of bottlers either don't remove contaminants because they produce and market spring or mineral water, or they use other technologies.

A matter of dollars and cents

Expense is likely the simple most important reason that only one in seven bottlers use distillation. The major cost factor is equipment. Operators can invest more than \$100,000 in setting up a first-class distillation system while RO systems are about a tenth of that total. The cost of energy required to heat the water to boiling in the distillation process has historically made even the cost of producing a gallon of distilled water much more expensive than RO. New distillation technology has answered that challenge, as we shall see.

Yet, in the long run, distillation can be quite economical. For one thing, while RO typically creates one gallon of reject water for every gallon of product water produced, distillation produces up to six gallons of product water for every gallon of reject water it produces.

Distillation is broadly viewed as the single most effective method of purifying water. High quality water can be produced by distillation from virtually any municipal supply: wells (bore holes), springs, lakes, and rivers. Because of the extended boiling process, any microbiological contaminants, including *Cryptosporidium*, are killed.

While there are different types of distillers, they all operate on nature's basic principles:

- Water is heated to boiling, changing it into a gas (steam), leaving impurities behind.

- As the steam cools, it condenses back into water.
- Condensation is collected as distilled water.

Two types of systems

Two basic types of distillation systems are multiple effect (ME) and vapor compression (VC). VC distillers operate on the principle of heat exchange to recycle heat generated to boil the water, thus conserving energy.

ME distillers are more simply designed. With no moving parts, there's nothing really to wear out. Distillers with more than one boiler (effect) are designed to recycle the heat energy, which creates the steam in the first boiler to heat the water in the second boiler. A two-boiler unit produces twice the distilled water as a single-boiler unit for the same cost. A four-boiler unit produces four times the water and a six-boiler unit will price six gallons of water for the approximate cost of distilling one gallon of water.

Technical advances, as seen in the latest VC systems, allow many of today's better commercial distillation systems produce water to 1 part per million (ppm) total dissolved solids (TDS) at a fraction of the cost of earlier distillers. In fact, bottled water companies can offer very competitive prices on their products often equal to – or even less than – companies using RO systems.

“Initial investment is certainly higher for distillation equipment than for RO,” said Troy Krause, manager of Norland Pure, Norland's home and office water delivery operation. “But the actual costs of producing a gallon of water using the newest vapor compression-style distillers is now about equal with a gallon produced by RO.”

Distillation produces water at one cent per gallon. RO produces water at slightly less.

Locally, Krause said Norland Pure competes on an even field with our RO competitors. “In fact, our prices are often a little lower than theirs,” he said. “And while the average customer thinks that ‘bottled water is bottled water,’ there's still a perceived value of the product in the customer's eye if they know it's distilled. And of course, some of our customers demand distilled for use in science labs and doctor's offices.

Distillation gives us a product differentiation. All of our competition uses RO, so we can talk about the benefits of distilled water,” he said.

Part of customer awareness

Krause's salespeople are trained to emphasize that product differentiation.

“We tell them the benefits of distilled water include a better taster, a more consistent product and distillation removes more impurities than RO,” Krause said. “Another advantage to distilled water is primarily for ourselves. That we sell only distilled water assures us that we're providing our customers with the best water possible.”

Norland Pure, like most other bottlers using distilled water, first softens its feed water with an ion exchange treatment system before water enters the distiller.

“This treatment removes a lot of minerals that can create scaling and other corrosion within the distillers themselves,” he said. “We want to remove as much of such minerals and nitrates as we can up front, so we don't have to deal with them in the distillers.”

Norland Pure also uses an activated carbon filtration system to, “put a polish on our finished product to make it the highest quality water we can produce,” Krause said. “If our product water doesn't test out at 1 ppm TDS, then we don't bottle it.”

By comparison, municipal water guidelines are a maximum of 500 ppm TDS.

Conclusion

Distillation is nature's way of removing impurities from water. While investment in equipment remains higher for distillation systems, the latest technology has lowered the actual cost of producing a gallon to about one penny per gallon. The answer is in the design of today's energy-conserving distillation equipment.

FYI: Vapor Compression Technology

The boiling process begins with both heating elements turned on. As the water in the boiling chamber reaches near-boiling temperatures, the compressor turns on, engaging the non-contacted liquid ring seal. When the operating boiling temperature is reached, the #2 heating element turns off and the #1 heating element cycles on and off, maintaining the boiling at just the right temperature. This step minimizes the amount of energy required to heat the water, achieving maximum efficiency.

The steam from the boiling water flows through a baffling system and then into the compressor. In the compressor, the steam is pressurized, which raises the steam's temperature before it's routed through a special heat exchanger located inside the boiling chamber. The pressurized steam is at a higher temperature than the feed water inside the boiling chamber. The pressurized steam gives off its heat to the feed water inside the boiling chamber, causing this water to boil and creating more steam.

While the pressurized steam is giving off its latent heat, the steam condenses. One of the heating elements will cycle on and off periodically as needed to provide any "make-

up" heat that's required to keep the system operating at optimum temperature for maximum efficiency. At this stage, the condensed steam is considered distilled water, but it is still very hot - only slightly cooler than boiling water. This outgoing hot distilled water preheats the incoming new feed water that will soon be distilled.

As the incoming water is preheated, the outgoing distilled water cools to within 20°F (11°C) of the incoming feedwater temperature. This exchange helps to pre-heat the incoming feed water to within a few degrees of the boiling temperature, saving even more energy. High-quality vapor compression distillers recycle nearly 98 percent of energy required. It uses about 0.12 kilowatts per hour (kWh) of electrical produce one gallon (3.78 liters) of distilled water. Depending on local electricity rates, power costs could be as little as one cent per gallon.