Clean Water

for an entire village

An engineering concept that incorporates high efficiency water treatment and purification with advanced solar power systems.

3TM International, Inc.

INTRODUCTION

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In the United States, a simple turning of a handle or pushing of a button yields copious amounts of clean, safe drinking water. In fact, most families in the United States *waste* more drinking water in a single month than families in foreign countries *use* in an entire year.

Plagued by a lack of technology and infrastructure, many families in foreign countries resort to using water from unsafe sources – streams, rivers, canals, ponds, and even mud puddles. These sources are generally contaminated with a range of chemical contaminants and waterborne pathogens, making the water unsafe to drink.

Exacerbating this problem are the lack of electricity, a delivery infrastructure, and an overall financial mechanism for solving the problem.

Indeed, the availability of safe drinking water rivals the availability of fossil fuels as the world's number one resource challenge.

PROGRAM OBJECTIVES

In a typical village, water may be available, but contaminated with chemicals and pathogens. Electrical power may be unavailable, or unreliable. Thus, the means of providing safe drinking water in a reliable manner is very problematic. Clearly, a better solution is required.

In doing so, 3TM International can provide a Program to:

- Improve social and commercial environments by providing pure drinking water to an entire village
- Work with local governments and businessmen, NGOs, and humanitarian groups to effect long-term viable solutions
- Provide "green" technologies that are self-sustaining
- Implementing a Distributor Business Model

THE SOLUTION: TECHNOLOGY

Solutions to providing safe drinking water range from the construction of simple groundwater well systems to solar jars to sophisticated water treatment and purification systems.

The solution proposed herein incorporates modern, state-of-the-art water treatment / purification technology with advanced solar power technology.

Thus, the solution offers widespread potential to those foreign countries that not only lack treatment / purification technology, but also electrical power to operate advanced systems.

THE TECHNOLOGY

Summary of 3TM Portable Field Units
Water Purification Technology
PFU-60 and PFU-720 Series

- Small, portable, and efficient water purification units
- Ideal for disaster relief and emergency preparedness
- Advanced robust design for emergency use and providing of drinking water to small villages and residential clusters
- Easy to use, with minimal training and maintenance required
- Treatment capacities of 1 – 12 gallons per minute (4 – 48 liters per minute)
- Units can be scaled up or used in tandem for larger applications to serve thousands of residents
- Technology includes proprietary combination of primary filtration, carbon block, and UV disinfection
- Best application is the purification of contaminated well water, city water, river and lake water, and other fresh water sources
- Very effective on waterborne pathogens and contaminants (e.g., parasites, bacteria, and viruses) and nominal chemical contamination (e.g., Arsenic and toxic metals)
- Produces drinking water that meets International Drinking Water Standards
- Can be used in conjunction with conventional AC power (110 / 220 VAC), vehicle batteries, or solar power systems
- Typical treatment cost is about $0.01 per gallon (includes: amortization of capital cost + operating cost + consumables)

PFU-60

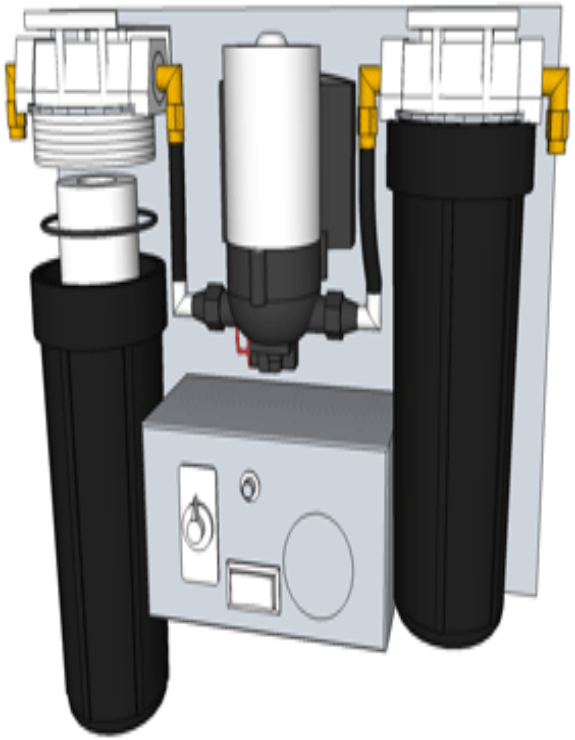
60 Gallons/Hour

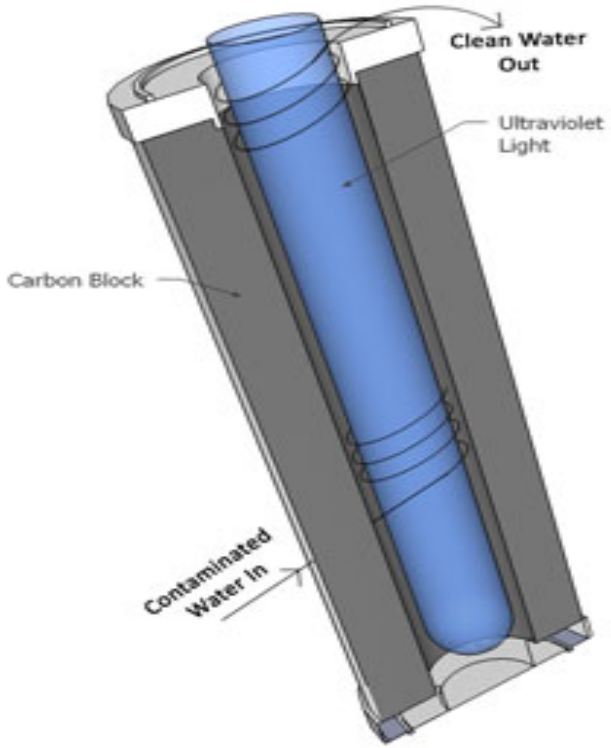
3TM International, Inc.

PFU-720

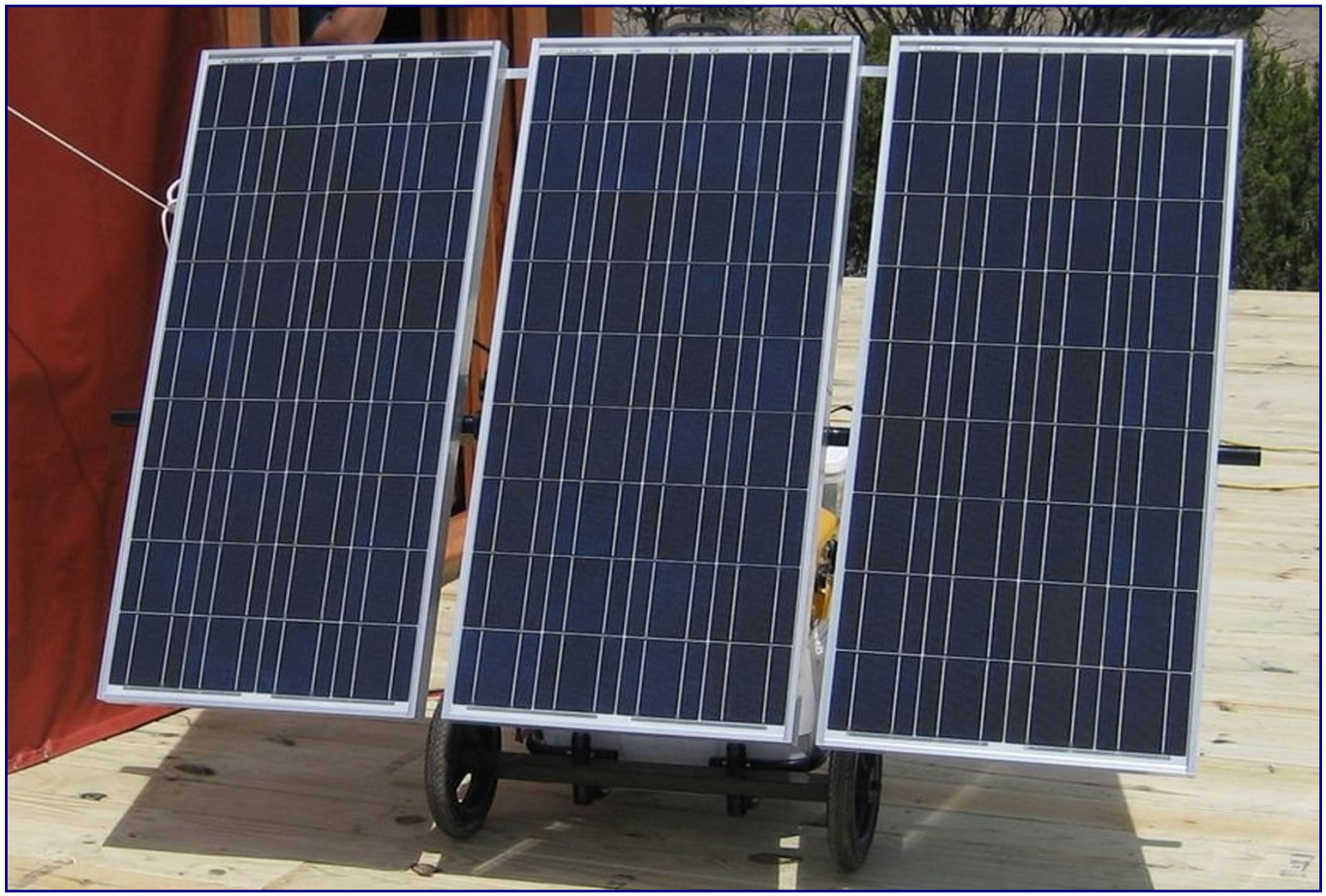
720 Gallons/Hour

3TM International, Inc.





The key to the PFU Technology is a patented treatment – disinfection system.



Advanced Solar System Design

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THE SOLUTION: MATCHING TECHNOLOGY WITH THE NEED

Solutions are only as good as their conformance to the customer's need. This involves a full understanding of the following engineering considerations:

- Influent water
  - Source
  - Quality
  - Reliability
- Effluent water
  - Uses (drinking, cooking, ice, bathing)
  - Storage
  - Irrigation
- Equipment configuration
  - Source of power / reliability
  - Reliability and redundancy
  - Storage and distribution
  - Ease of operation and maintenance
- Cost of operation

There is no such thing as a "standard water treatment unit"

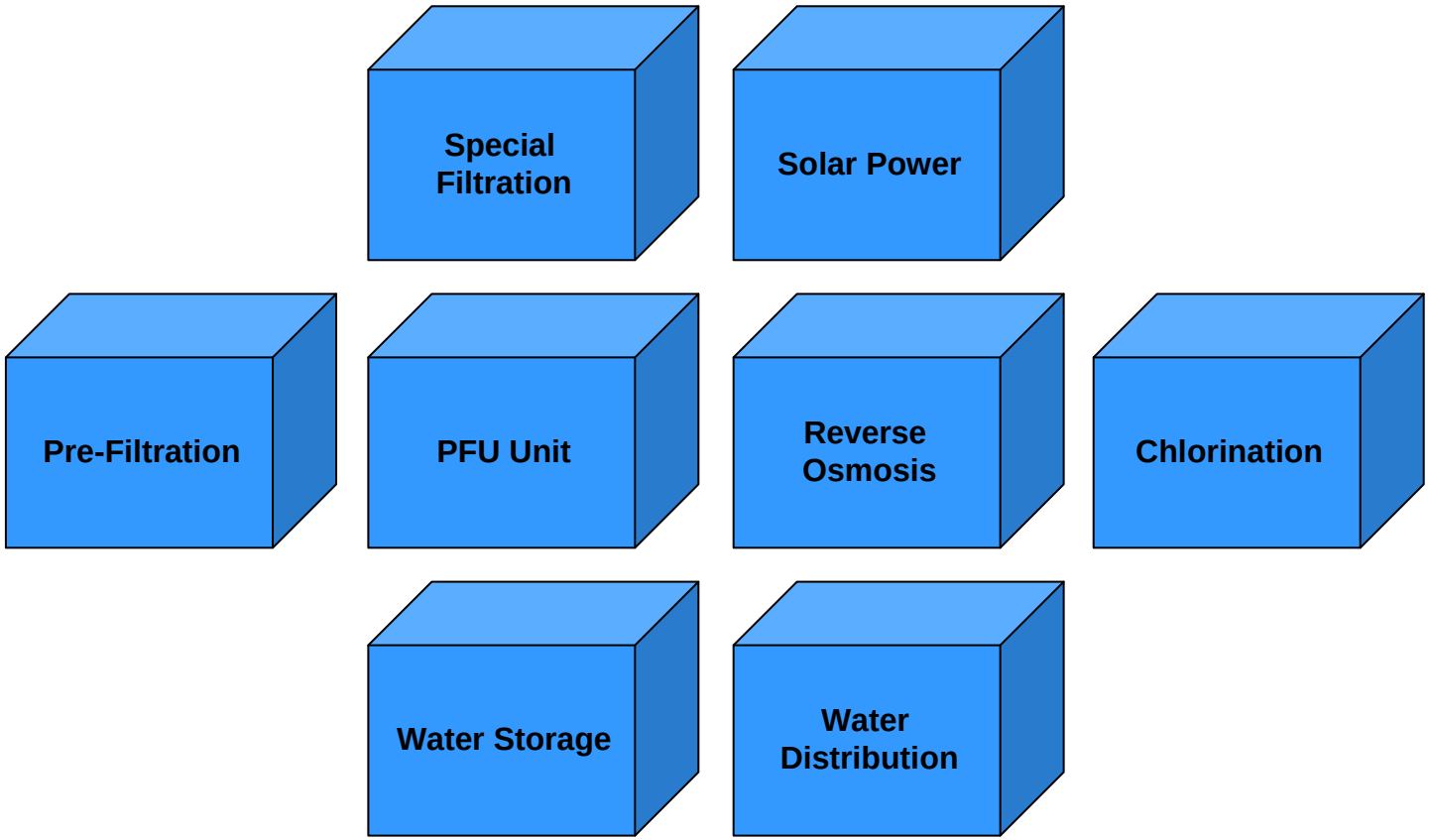
Consideration must be given to:

- Number of end users
- Daily use per end user
- Quality of the influent water
- Power system
- Water storage flexibility
- Overall reliability and redundancy

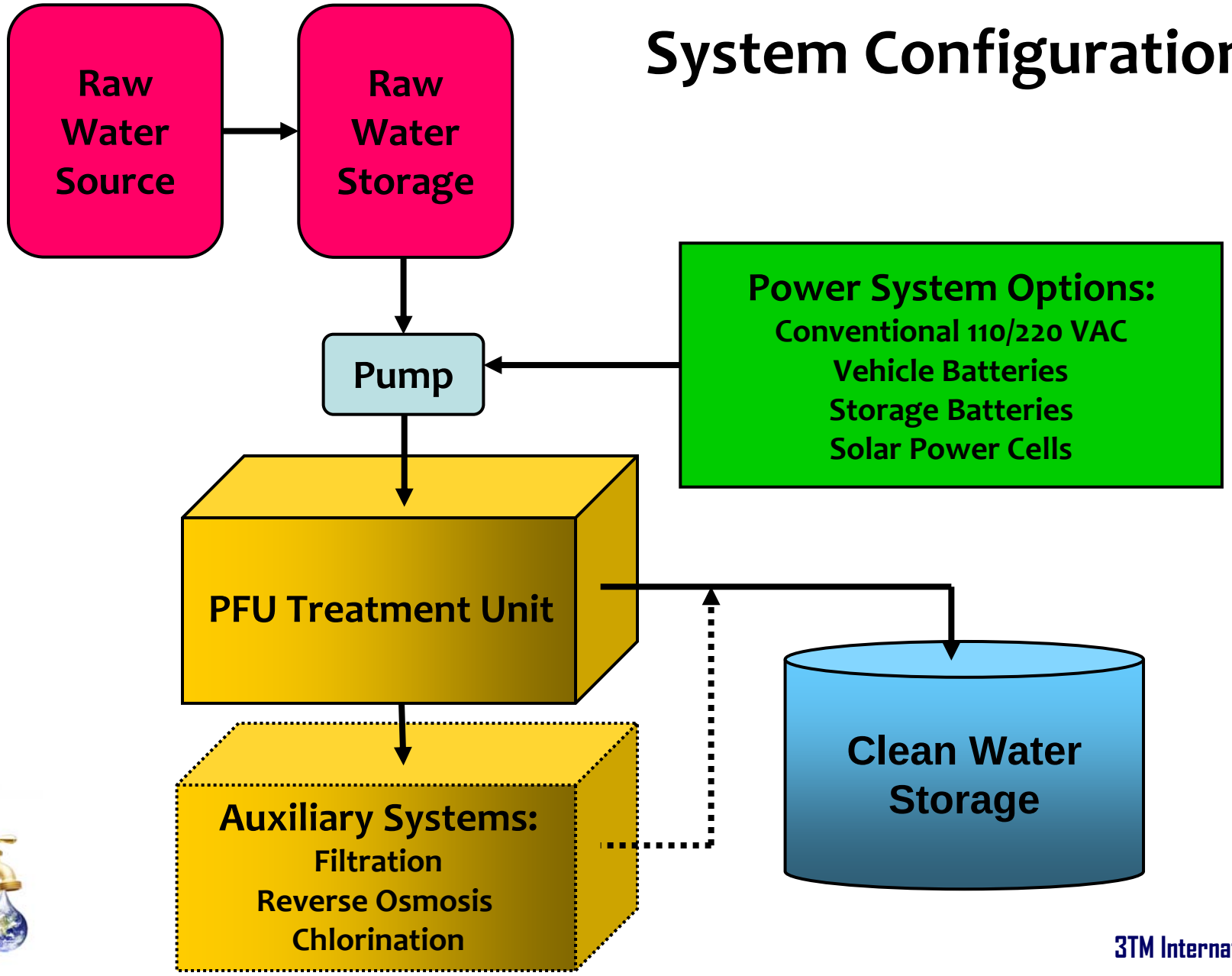
This translates into:

- Capacity of the water treatment unit
- Design of the water treatment unit
- Accessory package
- Business horizon timeline
- Capital cost, operating cost, per-unit treatment cost

Depending on the needs of the customer, the ultimate water treatment system could include a variety of components



System Configuration



PERFORMANCE STANDARDS

Performance Specifications of a GOOD SYSTEM

- Functional, and meets intended use
- Easy to set up, start up, and operate
- Reliable, with minimal repairs and down time
- Redundant components, for continual operation
- Meets specification without field testing
- Long lifetime, long individual component lifetime
- Robust and durable, and user friendly
- “Mil – Spec” quality

ISO 9001 Quality Assurance

The PFU Series units fully comply with ISO 9001 Standards.

The objective of ISO 9001 is to provide a set of requirements that, if effectively implemented, will provide customers with confidence that the water treatment unit can consistently:

- **Meet customer needs and expectations and**
- **Comply with applicable regulations**

The requirements cover a wide range of topics, including supplier's top management commitment to quality, its customer focus, adequacy of its resources, employee competence, process management (for production, service delivery and relevant administrative and support processes), quality planning, product design, review of incoming orders, purchasing, monitoring and measurement of its processes and products, calibration of measuring equipment, processes to resolve customer complaints, corrective/preventive actions and a requirement to drive continual improvement of the QMS. Last, but not least, there is a requirement for the supplier to monitor customer perceptions about the quality of the goods and services it provides.

US General Services Administration (GSA)

The PFU Series units are registered with the GSA.

GSA establishes long-term government-wide contracts that allow customers to acquire a vast array of supplies (products) and services directly from commercial suppliers.

GSA awards contracts to responsible companies offering commercial items, at fair and reasonable prices, that fall within the generic descriptions in the GSA Schedule Solicitations. Contracting Officers determine whether prices are fair and reasonable by comparing the prices/discounts that a company offers the government with the prices/discounts that the company offers to commercial customers.

GSA Schedules provide fast, flexible, cost-effective procurement solutions that allow customers to meet acquisition challenges, while achieving their missions.

US EPA NSF 248

The PFU Series units fully comply with US EPA NSF 248 Requirements.

Protocol P248 was derived and adapted primarily from existing publications of the US Environmental Protection Agency and NSF International. It describes the procedures to be used to test individual water purifiers (IWPs) designed to achieve removal or inactivation of microbiological contaminants, including bacteria, viruses, protozoa, and protozoan cysts and oocysts from virtually any fresh water source likely to be encountered by military personnel during exercises and deployments.

US EPA NSF 231

The PFU Series units fully comply with US EPA NSF-231 requirements.

Developed by NSF in 2003, NSF P231 establishes product safety and performance requirements for microbiological water purifiers to ease concerns about microbiological contaminants in drinking water. In accordance with NSF P231, these water devices must remove, kill, or inactivate disease-causing bacteria, viruses, and cysts to make the processed water safe for drinking.

CERTIFICATE OF ANALYSIS

Triad Forensics
Independent Service Laboratory
391 Technology Way Suite 167 Lab 1
Winston-Salem, North Carolina 27101
Tel 336-722-8963 Fax 336-722-8969
URL: www.TriadForensic.com

Date Received: 05/04/2010
Date Reported: 05/24/2010
Case Number: TFL-0906A

Product Tested: Portable 1 gallon per minute water disinfection purifier

Test Performed: USEPA NSF P248 (2008) and P231 Biological Challenge

Methodology: Protocol for evaluating the microbiological treatment capabilities of water purifiers producing water intended for human consumption

Independent Laboratory Testing Results: Independent laboratory testing found that the1 gallon per minute water purifier unit achieved the microorganism contaminant reductions in accordance with the levels set fourth by NSF and EPA in Protocols P248 (2008) and P231 by producing microbiologically safe water. The results obtained from independent laboratory testing validate the unit as a highly dependable product for its intended use. Due to its design, ease of use, and speed of reducing waterborne pathogens, the unit is an effective system for producing microbiologically safe water for human consumption.

Target Microorganism	Targeted Reduction Efficacy	Independent Laboratory Test Results
Escherichia coli	99.9999%	Passed > 99.9999% Reduction
Bacteriophage ssRNA Coliphage Fr Virus	99.99% Coliphage	Passed > 99.99% Reduction
Bacteriophage ssRNA Coliphage MS2 Virus	99.99% Virus	Passed > 99.99% Reduction
Cryptosporidium parvum	99.9% Cyst	Passed > 99.9 % Reduction

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PRO FORMA
COST ANALYSIS

3TM Pro Forma Calculation Model

Inputs

Demographics
Consumer Needs
Power Availability
Source and Quality of Water

Outputs

Conceptual Design
Total Capital Costs
Annual Operating Costs
Amortized Per Unit Treatment Costs
Sensitivity Analysis

Production Cost: pennies per gallon

Pro Forma Economic Analysis
Capital Investment Cost of Various Treatment Components

US Dollars
FOB Houston, Texas USA

	PFU-60 60 gal/hour	PFU-720 720 gal/hour
Treatment / Purification Unit	4,000 – 6,000	12,000 – 18,000
Auxiliary Systems (if needed):		
Pre-Treatment Unit	200	200
Solar Power Unit	10,000	20,000
Reverse Osmosis Unit	3,000	16,000
Chlorination Unit	1,500	1,500
Water Storage Unit	2,000	2,000

Note: Figures for auxiliary systems are nominal amounts, and not based on a specific design.

Pro Forma Economic Analysis
Per Unit Annual Operating Expenses
FOB Houston, Texas USA

	PFU-60 $/gallon	PFU-720 $/gallon
PFU Treatment / Purification		
Operating Expenses	0.005	0.005
PFU + Solar Power System		
Operating Expenses	0.005	0.005

Note: Figures shown are nominal amounts for a 12-hour per day operation, and not based on a specific design.

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