

# Safety on water refilling station

[Environment](#), [Water](#)



This study tackles the safeties of processes used by water refilling stations in the Philippines, specifically on the National Capital Region, on the purified water it sells to its customers. The study focuses on the processes the water refilling stations implements to purify the water from its concessionaires, not in the working place of water refilling stations. The group chose to research on this topic since nowadays, as the demand for cleaner water becomes higher, the price of household water purifiers and bottled water has become prohibitive.

Water refilling stations managed by private entrepreneurs offer a cheaper and more convenient solution to the public's drinking water needs than bottled water or the use of household filters. The demand at the water refilling stations - water stores that sell purified water is now increasing. The quality of purified water conforms to the national standards for drinking water and is even better than the quality of water produce by traditional water supply systems in terms of removed impurities. At present, about 3, 000 water refilling stations have proliferated nationwide.

They sell purified water of comparable quality with bottled water at a lower price. For example, the current price per gallon of refilled purified water in Metro Manila ranges from P 50 to P 120 per 5-gallon container or about P 2. 50 to P 6. 00 per liter while the bottled water is sold at P 12. 00 to P 25. 00 per liter. Household filters, on the other hand, cost P 5, 000 to P 25, 000 per unit. In Metro Manila, most of the water refilling stations is connected to the pipes of two concessionaires: Maynilad Water Company or Manila Water Company for their source of raw water while in other areas they opt to use private deep wells.

The “potable water” supplied by the providers is then further purified by utilizing a combination of water treatment equipment, such as sediment filters, carbon filters, water softeners, reverse osmosis membranes, ultra-violet lamps, and ozone generators. Typical water refilling stations can produce 3, 000 to 12, 000 litres of purified water per day. In previous years, most of the people were bringing a container to a water refilling station to buy purified water. Nowadays, because of convenience on the part of the consumers, purified water in 5-gallon (22. litres) containers is delivered by the station directly to the people’s home. Aqua Sure, a water refilling station in Metro Manila, can deliver 5, 500 gallons (25, 000 litres) a day to its 8, 000 household client.

## **Introduction**

### **Problem Statement**

The proponents want to know how dirty water is being processed in the water station, what processes does the water goes through, what is the quality of the water being produced and how safe it is to drink that water after.

### **Significance**

The study will: determine the physical, chemical and bacteriological quality of the product water produced \* determine if the water produced is potable \* assess the current guidelines used for evaluating and monitoring the quality of the water produced \* provide basis for decision making and strategy for regulation and monitoring of water stations to ensure a continuous production of quality and safe drinking water

## Review of Related Literature

Water is the only substance found on earth in three forms solid, liquid, and gas. It regulates the earth's temperature.

Drinking water or potable water is water safe enough to be consumed by humans or used with low risk of immediate or long term harm. In most developed countries, the water supplied to households, commerce and industry meets drinking water standards, even though only a very small proportion is actually consumed or used in food preparation. Typical uses include toilet flushing, washing and landscape irrigation. It also regulates the temperature of the human body, carries nutrients and oxygen to cells, cushions joints, protects organs and tissues, and removes wastes.

Adverse health effects from contaminants that may occur in drinking water include acute effects that may immediately impact health and chronic effects that may occur if contaminants are ingested at unsafe levels over many years. Drinking water that meets US EPA's health-based standards is generally safe. People who are not healthy as a result of illness, age, or weakened immune systems, are more likely to be at risk from certain contaminants that may be found in drinking water. Infants and very young children are also more susceptible to some contaminants.

Individuals concerned about their particular situations should consult their health care providers.

## Research Questions

Below are the guide questions which the proponents of the research work considered in conducting this research paper:

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- What is safe drinking water?
- What is the process of cleaning the water?
- What are the problems in the process?
- How would the proponents go about investigating the causes of the observed problems?
- What are the effects of these observed problems? What are the unsafe conditions in the process?
- What is the quality of the water after the process?

### Methodology

The proponents did an actual observation inside a water refilling station by identifying the process and the worker demonstrated how the process works. Next is that the proponents researched on the safety of drinking water of water stations by looking up at articles, assessing and analyzing which causes the impurities of the water and if there are problems on the process and if the process needs improvement.

After is that they establish a conclusion and the proponents monitor and implement the correct process. They also see if it's compatible with the system. Lastly, they did adequate measures and controls to ensure that the correct process will be established and if the water station is implementing it always. It is important to follow the correct process so that they can say that the water is safe for drinking.

### Discussion

Unsafe water

- More than one billion people lack access to an improved water source. 88 percent of the 4 billion annual cases of diarrheal disease are attributed to unsafe water and inadequate sanitation and hygiene.
- 2 million people suffer diarrhoeal deaths each year.

#### Drinking water Parameters

- Alkalinity
- Color of water
- pH
- Taste and Odor
- Dissolved metals and salts(sodium, chloride, potassium, calcium, manganese, magnesium)
- Microorganism
- Dissolved metals and metalloids ( lead, mercury, arsenic, etc
- Dissolved organics
- Radon

#### Heavy metal Machines for processes

- Multi-media sediment filter – removes sediments such as rust, sand, and particles that are invisible to the naked eye.
- Ion exchanger – replaces hard minerals with soft minerals.
- Activated carbon filter – removes all organic chemicals, herbicide, pesticide, offensive odor and bad taste.
- Reverse osmosis membrane – the heart of the system and the most expensive unit; removes inorganic minerals, bacteria, and viruses while retaining its oxygen content. Since the filter size is very small at

less than 0.5 micrometer, the product water could have a total dissolved solids (TDS) of less than 10 ppm. The filtration process rejects about 50 percent of raw water volume.

- Post-carbon filter – improves the taste of water.
- Ultraviolet lamp – ensures that the water is free from disease-causing micro-organisms.
- Ozone generator – inhibits the growth of bacteria in the product tank and prolongs the shelf life of water. Water quality monitoring
- Bacteriological quality – at least monthly
- Physical quality – at least every six (6) months Chemical quality – at least every six (6) months
- Biological quality – at least once a year
- Monitoring of radioactive contaminants shall be done only if there is significant input of radiation from the surrounding environment.

## **Conclusion**

Water refilling stations can be a good source of safe drinking water in the Philippines. Purified water can meet the aesthetic standards easily detectable by the people in terms of taste, odor and color. The efficient water purification processes can make the quality of water superior to the traditional water systems.

However, the risk of contamination is possible if the handling practices are not closely monitored. The water production has designed its facility to the high quality state of the art which can process and purify water into a colorless and free from objectionable taste and odor. That the product water is free from substance that may contain to endanger the lives of consuming

public the design of the water treatment purification process was based on the character of the source of water the availability of appropriate purification technology. 5. About the Authors

The ideas behind this study are from four 3rd Year Safety Engineering students of the Industrial Engineering Department of the University of Santo Tomas namely: Christian Domingo Bascon, Mishael Ann Asuncion Belocura, Edmond Ray Dela Cruz Divino and Wy Janet Dy Yang The four students have a strong passion on Safety Engineering and want to contribute as early as now in the safety of everyone. 6. Acknowledgement First and foremost, we would like to thank to our professor Sir Nestor Ong for the valuable guidance, technical discussions and relevant discussions.

He inspired us greatly to work in this project. We also would like to thank him for showing us some example that related to the topic of our project. In addition, we would also like to thank Antipolo Spring Water Refilling Station which provided us valuable information as the guidance of our project which helped us in completing this task through various stages. We also wanted to thank our families who inspired, encouraged and fully supported us in every trial that came our way. Also, we thank them for giving us not just financial, but moral and spiritual support.

And all of those who supported us in any respect during the completion of the project. Lastly, we offer our regards and blessings to God the father of all, we are thankful for the strength that keeps us standing and for the hope that keeps us believing that this affiliation would be possible and more interesting. 7. Notes \* Especially in urban areas, water quality does not meet the standards set by the national government.



As a result, waterborne diseases remain a severe public health concern in the country. About 4, 200 people die each year due to contaminated drinking water. Your local water supplier is required by law to notify you if there's any reason your water is unsafe. Furthermore, the Safe Water Drinking Act requires all water suppliers to issue their customers an annual report on the source and quality of the water—including a list of contaminant levels. Municipal water is tested for micro-organisms, organic and inorganic chemicals, disinfectants, disinfectant by-products, and radioactive substances. If your copy of the report has not come in the mail, call your water company.

Though your water company is responsible for keeping the water safe, lead can get into the supply after the water has left the treatment plant. Arsenic may also be a problem in some areas, mainly the Southwest. \* Filtering the water If you are simply trying to improve the taste of your water, a filtering pitcher will do. But if you are trying to remove lead, arsenic, or specific contaminants, you may want a permanent installation. Before you buy, be sure you know which contaminants the system will filter out. NSF is an excellent source of information.

Water filtration systems come in two basic types, ranging from cheap to expensive: \* Point-of-entry systems are installed on the main water supply and treat most or all the water entering a house. These include water softeners, which remove calcium and magnesium. There's no harm in drinking softened water, and it does not cause heart disease, as has been alleged. But the softer the water, the more likely it is to leach lead from the

pipes. \* Point-of-use systems include faucet-mounted filters, faucets with built-in filters, pitchers, and under-the-sink filters.

Whether it's installed under the sink or at point-of-entry, the most effective filter is a reverse-osmosis system, which filters out lead and other toxic metals and other contaminants. This type of filter can be expensive (\$500 to \$1, 000 or more) and the cartridges have to be replaced every year at a cost of up to \$200. Faucet-mounted systems and faucets with built-in filters work well against specific contaminants (check the labels and NSF certificates), as do most countertop pitchers. Simpler systems such as these represent a small investment, but replacement filters can cost as much as \$100 a year.

The agencies directly involved in the establishment operation of water refilling stations are as follows: a. The Department of Health (DOH). DOH is the main agency responsible for protecting the health of the people. The Sanitation Code of the Philippines mandates DOH in protecting drinking water quality. Consequently, DOH issues implementing rules and regulations prescribing sanitary standards for water supply systems, including water refilling stations. b. The Center for Health Development (CHD) is the regional branch of DOH.

Its main function is to provide technical assistance to local government units and to monitor DOH programme implementation which includes water quality and sanitation standards. For water refilling stations, CHD is mandated to issue initial and operational permits. c. The Local Government Units (LGUs) are mandated by Presidential Decree (PD 856) to issue sanitary permit, sanitary clearance, health certificates, certificate of potability,

drinking water site clearance and closure order (if necessary) and to conduct sanitary inspection of WRS. d.

The Water Quality Association of the Philippines Inc. (WQAP) is an organization of private firms who are engaged in the manufacture, sale, and distribution of water refilling station equipment and supplies, as well as water treatment and purification equipment and technology for household, institutional, commercial and industrial applications. About 85 percent of its 250 members operates water refilling stations. e. Association of Water Refilling Entrepreneurs (AWARE) concentrates on resolving business management issues of its members.

Presidential Decree No. 56 (PD 856) or the Sanitation Code of the Philippines is the main law requiring all establishments to comply with existing sanitary standards to protect public health. Guidelines for operating a water refilling station are indicated in the Supplemental Implementing Rules and Regulations on Water Supply of PD 856 issued in 1999. 8.

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