EXECUTIVE SUMMARY AND TECHNICAL INFORMATION

Background

The BioSand Filter™ was invented to serve the household and smaller communities with emphasis on its suitability in developing countries. Smaller community uses are now better served by the Manz Slow Sand Filter™ (MSF). These are mature technologies which may also augment or create new markets for commercial operations for corporations doing business in developing countries.

The patent rights to the BioSand filtration ("BSF") process are owned by Pure Filtered Water Ltd. This process patent allows the traditional slow sand water filtration systems to be stopped and started, thereby providing efficient usage which was not available before at a household or smaller community level, as the application for traditional slow sand filters is at a municipal level.

Technical Novelty

The BSF has the following features enable it to make a significant contribution especially in developing countries

- **Removes toxins and pathogens** – arsenic, water borne parasites, bacteria and viruses, iron (and iron bacteria), manganese, fluoride, sulphur smell and other obnoxious gases, colour, foul taste, toxins, silt, sediments and algae.

- **Easy to use** – contaminated water is poured in the top of the filter and it is in effect collected immediately from the outlet ready for drinking.

- **Well accepted by end-users** – this information is based on third party interviews of the householders who use the filter in developing countries; they also state that the water tastes better and they feel better.

- **Affordable** – providing safe water through a sustainable low one time only capital cost.

- **Does not require ongoing replacement parts** and operates effectively for at least ten years.

- **Allows shifting to and from surface and ground water** – due to the wide range of pathogen, particulate and toxin removal, it enables the user to seek out the most convenient water source.

- **Targeted for household use** – easy to clean, removing the complexity associated with traditional slow sand filtration systems. Recent adaptations have been made to enable the use of local low cost materials in the manufacture of the product.

- **Robust technology** that does not clog up easily and it is well suited to the most demanding environments.

There are approximately 300,000 household BioSand Filters™ which have been distributed through 70 countries, mainly in developing countries. Information on a number of the specific applications to date is available at www.manzwaterinfo.ca

How It Works

The filter is filled with several layers of sterile media specially manufactured from a hard, impervious uncontaminated media, each of a different degree of fineness. Contaminated water is poured into the top and emerges from the bottom of the filter ready for drinking. It is purified by flowing through the media and by a naturally occurring biological payer that forms on the top of the media. This is a mature technology based on the same principles as used widely in large scale municipal slow sand filtration facilities.

The BioSand Filter™ produces consistent quality water after set up and conditioning. The biological layer on top of the filter grows and collects the various particulate being removed. The flow becomes impeded over time which may be the situation in days or many months depending on the quality of the raw water. When the householder decides the flow is too slow the user may maintain it. This entails pouring water into filter, agitating that upper 1 cm of sand with the rod and then use a ladle to remove as much of the water as possible, taking care not to scrape the surface of the sand.

Credentials of the Technology

Appendix I "New Horizons for Sand Filtration, April 3, 2004" is a definitive paper on the efficacy of the BSF. **Appendix II** "Toxicant and Parasite Challenge of the Manz Intermittent Slow Sand Filter" provides a study of the BSF in which Environment Canada participated. **Appendix III** is entitled "University of North Carolina Household Filter Treatment and Health Research in Cambodia 2005-2007" which studies field results. **Appendix IV** University of North Carolina "Evaluation of the Biosand Filter for Reducing Risks of Diarrheal Illness and Improving Drinking Water Quality in Communities of The Dominican Republic". **Appendix V** University of North Carolina "Point of Use Household Drinking Water Filtration: A Practical, Effective Solution for Providing Sustained Access to Safe Drinking Water in the Developing World" which compares various alternate technologies used in developing countries.